

D. ENGINEERING ANALYSIS

D.1 FACILITY DESIGN

Testimony of Shahab Khoshmashrab

D.1.1 SUMMARY OF CONCLUSIONS

The California Energy Commission staff concludes that the design, construction, and eventual closure of the project and its linear facilities would likely comply with applicable engineering laws, ordinances, regulations and standards. The proposed conditions of certification, below, would ensure compliance with these laws, ordinances, regulations and standards.

D.1.2 INTRODUCTION

Facility design encompasses the civil, structural, mechanical, and electrical engineering design of the Ridgecrest Solar Power Project (Ridgecrest Solar) and is not intended as a California Environmental Quality (CEQA) or National Environmental Policy Act (NEPA) analysis. The purpose of this analysis is solely to:

- Verify that the laws, ordinances, regulations and standards (LORS) that apply to the engineering design and construction of the project have been identified;
- Verify that both the project and its ancillary facilities are sufficiently described, including proposed design criteria and analysis methods, in order to provide reasonable assurance that the project would be designed and constructed in accordance with all applicable engineering LORS, in a manner that also ensures the public health and safety;
- Determine whether special design features should be considered during final design to address conditions unique to the site which could influence public health and safety; and
- Describe the design review and construction inspection process and establish the conditions of certification used to monitor and ensure compliance with the engineering LORS, in addition to any special design requirements.

Subjects discussed in this analysis include:

- Identification of the engineering LORS that apply to facility design;
- Evaluation of the applicant's proposed design criteria, including identification of criteria essential to public health and safety;
- Proposed modifications and additions to the application for certification (AFC) necessary for compliance with applicable engineering LORS; and
- Conditions of certification proposed by staff to ensure that the project would be designed and constructed to ensure public health and safety and comply with all applicable engineering LORS.

D.1.3 LAWS, ORDINANCES, REGULATIONS AND STANDARDS

Lists of LORS applicable to each engineering discipline (civil, structural, mechanical, and electrical) are described in the AFC (Solar Millennium 2009a, Appendix C). Key LORS are listed in **Facility Design Table 1**, below:

Facility Design Table 1
Key Engineering Laws, Ordinances, Regulations and Standards (LORS)

Applicable LORS	Description
Federal	Title 29 Code of Federal Regulations (CFR), Part 1910, Occupational Safety and Health standards
State	2007 (or latest edition) California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations)
Local	Kern County regulations and ordinances
General	American National Standards Institute (ANSI) American Society of Mechanical Engineers (ASME) American Welding Society (AWS) American Society for Testing and Materials (ASTM)

D.1.4 PROPOSED PROJECT

D.1.4.1 SETTING AND EXISTING CONDITIONS

The Ridgecrest Solar would be built on a site located in Kern County, California. For more information on the site and its related project description, please see the **PROJECT DESCRIPTION** section of this document. Additional engineering design details are contained in the AFC, Appendix C (Solar Millennium 2009a).

D.1.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The purpose of this analysis is to ensure that the project would be built to applicable engineering codes and ensure public health and life safety. This analysis further verifies that applicable engineering LORS have been identified and that the project and its ancillary facilities have been described in adequate detail. It also evaluates the applicant's proposed design criteria, describes the design review and construction inspection process, and establishes conditions of certification that would monitor and ensure compliance with engineering LORS and any other special design requirements. These conditions allow both the California Energy Commission (Energy Commission) compliance project manager (CPM) and the applicant to adopt a compliance monitoring scheme that would verify compliance with these LORS.

SITE PREPARATION AND DEVELOPMENT

Staff has evaluated the proposed design criteria for grading, flood protection, erosion control, site drainage, and site access, in addition to the criteria for designing and constructing linear support facilities such as natural gas and electric transmission interconnections. The applicant proposes the use of accepted industry standards (see

Solar Millennium 2009a, Appendix C, for a representative list of applicable industry standards), design practices, and construction methods in preparing and developing the site. Staff concludes that this project, including its linear facilities, would most likely comply with all applicable site preparation LORS, and proposes conditions of certification (see below and the **GEOLOGY AND PALEONTOLOGY** section of this document) to ensure that compliance.

MAJOR STRUCTURES, SYSTEMS, AND EQUIPMENT

Major structures, systems, and equipment are structures and their associated components or equipment that are necessary for power production, costly or time consuming to repair or replace, are used for the storage, containment, or handling of hazardous or toxic materials, or could become potential health and safety hazards if not constructed according to applicable engineering LORS. Major structures and equipment are identified in the proposed Condition of Certification **GEN-2**, below. Typically, **Facility Design Table 2** in Condition of Certification **GEN-2** lists the major structures and equipment identified in the AFC and other project related information available before project licensing; this list is based on the preliminary design of the project. The master drawing and master specifications lists described in Condition of Certification **GEN-2**, however, include the project-related documents based on the project's detailed design and may include additional documents for structures and equipment not identified in **Facility Design Table 2**. (Detailed project design typically occurs after project licensing and is not available at this time.)

Ridgecrest Solar shall be designed and constructed to the 2007 California Building Standards Code (CBSC), also known as Title 24, California Code of Regulations, which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and other applicable codes and standards in effect when the design and construction of the project actually begin. If the initial designs are submitted to the chief building official (CBO) for review and approval after the update to the 2007 CBSC takes effect, the 2007 CBSC provisions shall be replaced with the updated provisions.

Certain structures in a power plant may be required, under the CBC, to undergo dynamic lateral force (structural) analysis; others may be designed using the simpler static analysis procedure. In order to ensure that structures are analyzed according to their appropriate lateral force procedure, staff has included condition of certification **STRUC-1**, below, which, in part, requires the project CBO's review and approval of the owner's proposed lateral force procedures before construction begins.

PROJECT QUALITY PROCEDURES

The project's AFC (Solar Millennium 2009a, Appendix C) describes a quality program intended to inspire confidence that its systems and components will be designed, fabricated, stored, transported, installed, and tested in accordance with all appropriate power plant technical codes and standards. Compliance with design requirements will be verified through specific inspections and audits. Implementation of this quality

assurance/quality control (QA/QC) program will ensure that Ridgecrest Solar is actually designed, procured, fabricated, and installed as described in this analysis.

COMPLIANCE MONITORING

Under Section 104.2 of the CBC, the CBO is authorized and directed to enforce all provisions of the CBC. The Energy Commission itself serves as the building official, and has the responsibility to enforce the code, for all of the energy facilities it certifies. In addition, the Energy Commission has the power to interpret the CBC and adopt and enforce both rules and supplemental regulations that clarify application of the CBC's provisions.

The Energy Commission's design review and construction inspection process conforms to CBC requirements and ensures that all facility design conditions of certification are met. As provided by Section 104.2.2 of the CBC, the Energy Commission appoints experts to perform design review and construction inspections and act as delegate CBOs on behalf of the Energy Commission. These delegates typically include the local building official and/or independent consultants hired to provide technical expertise that is not provided by the local official alone. The applicant, through permit fees provided by the CBC, pays the cost of these reviews and inspections. While building permits in addition to Energy Commission certification are not required for this project, the applicant pays in lieu of CBC permit fees to cover the costs of these reviews and inspections.

Engineering and compliance staff will invite Kern County or a third-party engineering consultant to act as CBO for this project. When an entity has been assigned CBO duties, Energy Commission staff will complete a memorandum of understanding (MOU) with that entity to outline both its roles and responsibilities and those of its subcontractors and delegates.

Staff has developed proposed conditions of certification to ensure public health and safety and compliance with engineering design LORS. Some of these conditions address the roles, responsibilities, and qualifications of the engineers who will design and build the proposed project (conditions of certification **GEN-1** through **GEN-8**). These engineers must be registered in California and sign and stamp every submittal of design plans, calculations, and specifications submitted to the CBO. These conditions require that every element of the project's construction (subject to CBO review and approval) be approved by the CBO before it is performed. They also require that qualified special inspectors perform or oversee special inspections required by all applicable LORS.

While the Energy Commission and delegate CBO have the authority to allow some flexibility in scheduling construction activities, these conditions are written so that no element of construction (of permanent facilities subject to CBO review and approval) which could be difficult to reverse or correct can proceed without prior CBO approval. Elements of construction that are not difficult to reverse may proceed without approval of the plans. The applicant bears the responsibility to fully modify construction elements in order to comply with all design changes resulting from the CBO's subsequent plan review and approval process.

D.1.4.3 CEQA LEVEL OF SIGNIFICANCE

As described in the **INTRODUCTION** above, the Facility Design section addresses LORS consistency and provides the agencies a vehicle for verifying compliance with these LORS during construction and operation of power generating facilities. This section is not intended to address environmental impacts under either CEQA or NEPA.

D.1.5 RECONFIGURED ALTERNATIVE

The Facility Design section is not intended to address environmental impacts under either CEQA or NEPA.

D.1.6 REDUCED ACREAGE ALTERNATIVE

The Facility Design section is not intended to address environmental impacts under either CEQA or NEPA.

D.1.7 No Project / No Action Alternative

The Facility Design section is not intended to address environmental impacts under either CEQA or NEPA.

D.1.8 CUMULATIVE IMPACT ANALYSIS

The Facility Design section is not intended to address environmental impacts under either CEQA or NEPA.

D.1.9 COMPLIANCE WITH LORS

A detailed discussion of the proposed project's compliance with LORS applicable to facility design is provided above in subsection D.1.4.2.

D.1.10 NOTEWORTHY PUBLIC BENEFITS

Staff has not identified any noteworthy public benefits associated with this Facility Design section.

D.1.11 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

GEN-1 The project owner shall design, construct, and inspect the project in accordance with the 2007 California Building Standards Code (CBSC), also known as Title 24, California Code of Regulations, which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and

all other applicable engineering LORS in effect at the time initial design plans are submitted to the CBO for review and approval (the CBSC in effect is the edition that has been adopted by the California Building Standards Commission and published at least 180 days previously). The project owner shall ensure that all the provisions of the above applicable codes are enforced during the construction, addition, alteration, moving, demolition, repair, or maintenance of the completed facility. All transmission facilities (lines, switchyards, switching stations and substations) are covered in the conditions of certification in the **TRANSMISSION SYSTEM ENGINEERING** section of this document.

In the event that the initial engineering designs are submitted to the CBO when the successor to the 2007 CBSC is in effect, the 2007 CBSC provisions shall be replaced with the applicable successor provisions. Where, in any specific case, different sections of the code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.

The project owner shall ensure that all contracts with contractors, subcontractors, and suppliers clearly specify that all work performed and materials supplied comply with the codes listed above.

Verification: Within 30 days following receipt of the certificate of occupancy, the project owner shall submit to the CPM a statement of verification, signed by the responsible design engineer, attesting that all designs, construction, installation, and inspection requirements of the applicable LORS and the Energy Commission's decision have been met in the area of facility design. The project owner shall provide the CPM a copy of the certificate of occupancy within 30 days of receipt from the CBO.

Once the certificate of occupancy has been issued, the project owner shall inform the CPM at least 30 days prior to any construction, addition, alteration, moving, demolition, repair, or maintenance to be performed on any portion(s) of the completed facility that requires CBO approval for compliance with the above codes. The CPM will then determine if the CBO needs to approve the work.

GEN-2 Before submitting the initial engineering designs for CBO review, the project owner shall furnish the CPM and the CBO with a schedule of facility design submittals, and master drawing and master specifications lists. The schedule shall contain a list of proposed submittal packages of designs, calculations, and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide specific packages to the CPM upon request.

Verification: At least 60 days (or a project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO and to the CPM the schedule, the master drawing and master specifications lists of documents to be submitted to the CBO for review and approval. These documents shall be the pertinent design documents for the major structures and equipment listed in **Facility Design Table 2**, below. Major structures and equipment shall be added to or

deleted from the table only with CPM approval. The project owner shall provide schedule updates in the monthly compliance report.

**Facility Design Table 2
Major Structures and Equipment List**

Equipment/System	Quantity (Plant)
Steam Turbine Generator Foundation and Connections	1
Start-up Boilers Foundations and Connections	1
Generator Step-up Transformer Foundation and Connections	1
Overflow Vessel Foundation and Connections	1
Expansion Vessel Foundation and Connections	1
Weather Station Building Structure, Foundation and Connections	1
HTF Pumps Lube Oil Unit Foundation and Connections	2
Balance of Plant Electrical Building Structure, Foundation and Connections	1
Ullage Coolers and Vessel	1
Reheaters Foundation and Connections	2
MCC Cooling Tower Foundation and Connections	1
Gland Condenser Foundation and Connections	1
Lube Oil Console	1
Deaerator Foundation and Connections	1
LP/HP Pre-Heaters	1
Main Auxiliary Transformers Foundations and Connections	1
Air-cooled Condenser Structure, Foundation and Connections	1
Oil/Water Separator Foundation and Connections	1
Compressed Air System Foundation and Connections	1
Generator Circuit Breaker Foundation and Connections	1
Warehouse Building Structure, Foundation and Connections	1
Chemical Injection Skid Foundation and Connections	1
Cooling Tower Foundation and Connections	1
Water Tank Structure, Foundation and Connections	1
Take Off Tower Structure, Foundation and Connections	1
Blowdown Tanks Structure, Foundation and Connections	2
Sample Panel and Lab Building Structure, Foundation and Connections	1
Demineralized Water Tank Structure, Foundation and Connections	1
Administration Building Structure, Foundation and Connections	1
Control Building Structure, Foundation and Connections	1
Pipe Racks	1 Lot
Treated Water Tank Structure, Foundation and Connections	1
Pumps Foundation and Connections	1 Lot
Solar Field Reflectors and Receivers Foundations and Connections	1 Lot
Drainage Systems (including sanitary drain and waste)	1 Lot

Equipment/System	Quantity (Plant)
High Pressure and Large Diameter Piping and Pipe Racks	1 Lot
HVAC and Refrigeration Systems	1 Lot
Temperature Control and Ventilation Systems (including water and sewer connections)	1 Lot
Building Energy Conservation Systems	1 Lot
Substation, Switchboards, Transformers, Buses and Towers	1 Lot
Electrical Cables/Duct Banks	1 Lot
Prefabricated Assemblies	1 Lot

GEN-3 The project owner shall make payments to the CBO for design review, plan checks, and construction inspections, based upon a reasonable fee schedule to be negotiated between the project owner and the CBO. These fees may be consistent with the fees listed in the 2007 CBC, adjusted for inflation and other appropriate adjustments; may be based on the value of the facilities reviewed; may be based on hourly rates; or may be otherwise agreed upon by the project owner and the CBO.

Verification: The project owner shall make the required payments to the CBO in accordance with the agreement between the project owner and the CBO. The project owner shall send a copy of the CBO's receipt of payment to the CPM in the next monthly compliance report indicating that applicable fees have been paid.

GEN-4 Prior to the start of rough grading, the project owner shall assign a California-registered architect, or a structural or civil engineer, as the resident engineer (RE) in charge of the project. All transmission facilities (lines, switchyards, switching stations, and substations) are addressed in the conditions of certification in the **TRANSMISSION SYSTEM ENGINEERING** section of this document.

The RE may delegate responsibility for portions of the project to other registered engineers. Registered mechanical and electrical engineers may be delegated responsibility for mechanical and electrical portions of the project, respectively. A project may be divided into parts, provided that each part is clearly defined as a distinct unit. Separate assignments of general responsibility may be made for each designated part.

The RE shall:

1. Monitor progress of construction work requiring CBO design review and inspection to ensure compliance with LORS;
2. Ensure that construction of all facilities subject to CBO design review and inspection conforms in every material respect to applicable LORS, these conditions of certification, approved plans, and specifications;
3. Prepare documents to initiate changes in approved drawings and specifications when either directed by the project owner or as required by the conditions of the project;

4. Be responsible for providing project inspectors and testing agencies with complete and up-to-date sets of stamped drawings, plans, specifications, and any other required documents;
5. Be responsible for the timely submittal of construction progress reports to the CBO from the project inspectors, the contractor, and other engineers who have been delegated responsibility for portions of the project; and
6. Be responsible for notifying the CBO of corrective action or the disposition of items noted on laboratory reports or other tests when they do not conform to approved plans and specifications.

The resident engineer (or his delegate) must be located at the project site, or be available at the project site within a reasonable period of time, during any hours in which construction takes place.

The RE shall have the authority to halt construction and to require changes or remedial work if the work does not meet requirements.

If the RE or the delegated engineers are reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the resume and registration number of the RE and any other delegated engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the RE and other delegated engineer(s) within five days of the approval.

If the RE or the delegated engineer(s) is subsequently reassigned or replaced, the project owner has five days to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

GEN-5 Prior to the start of rough grading, the project owner shall assign at least one of each of the following California registered engineers to the project: a civil engineer; a soils, geotechnical, or civil engineer experienced and knowledgeable in the practice of soils engineering; and an engineering geologist. Prior to the start of construction, the project owner shall assign at least one of each of the following California registered engineers to the project: a design engineer who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; a mechanical engineer; and an electrical engineer. (California Business and Professions Code section 6704 et seq., and sections 6730, 6731 and 6736 require state registration to practice as a civil engineer or structural engineer in California). All transmission facilities (lines,

switchyards, switching stations, and substations) are handled in the conditions of certification in the **TRANSMISSION SYSTEM ENGINEERING** section of this document.

The tasks performed by the civil, mechanical, electrical, or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (for example, proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer.

The project owner shall submit, to the CBO for review and approval, the names, qualifications, and registration numbers of all responsible engineers assigned to the project.

If any one of the designated responsible engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned responsible engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

A. The civil engineer shall:

1. Review the foundation investigations, geotechnical, or soils reports prepared by the soils engineer, the geotechnical engineer, or by a civil engineer experienced and knowledgeable in the practice of soils engineering;
2. Design (or be responsible for the design of), stamp, and sign all plans, calculations, and specifications for proposed site work, civil works, and related facilities requiring design review and inspection by the CBO. At a minimum, these include: grading, site preparation, excavation, compaction, construction of secondary containment, foundations, erosion and sedimentation control structures, drainage facilities, underground utilities, culverts, site access roads and sanitary sewer systems; and
3. Provide consultation to the RE during the construction phase of the project and recommend changes in the design of the civil works facilities and changes to the construction procedures.

B. The soils engineer, geotechnical engineer, or civil engineer experienced and knowledgeable in the practice of soils engineering, shall:

1. Review all the engineering geology reports;

2. Prepare the foundation investigations, geotechnical, or soils reports containing field exploration reports, laboratory tests, and engineering analysis detailing the nature and extent of the soils that could be susceptible to liquefaction, rapid settlement or collapse when saturated under load;
3. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with requirements set forth in the 2007 CBC (depending on the site conditions, this may be the responsibility of either the soils engineer, the engineering geologist, or both); and
4. Recommend field changes to the civil engineer and RE.

This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform to the predicted conditions used as the basis for design of earthwork or foundations.

C. The engineering geologist shall:

1. Review all the engineering geology reports and prepare a final soils grading report; and
2. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in the 2007 CBC (depending on the site conditions, this may be the responsibility of either the soils engineer, the engineering geologist, or both).

D. The design engineer shall:

1. Be directly responsible for the design of the proposed structures and equipment supports;
2. Provide consultation to the RE during design and construction of the project;
3. Monitor construction progress to ensure compliance with engineering LORS;
4. Evaluate and recommend necessary changes in design; and
5. Prepare and sign all major building plans, specifications, and calculations.

E. The mechanical engineer shall be responsible for, and sign and stamp a statement with, each mechanical submittal to the CBO, stating that the proposed final design plans, specifications, and calculations conform to all of the mechanical engineering design requirements set forth in the Energy Commission's decision.

F. The electrical engineer shall:

1. Be responsible for the electrical design of the project; and
2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible civil engineer, soils (geotechnical) engineer and engineering geologist assigned to the project.

At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of construction, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible design engineer, mechanical engineer, and electrical engineer assigned to the project.

The project owner shall notify the CPM of the CBO's approvals of the responsible engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

GEN-6 Prior to the start of an activity requiring special inspection, including prefabricated assemblies, the project owner shall assign to the project, qualified and certified special inspector(s) who shall be responsible for the special inspections required by the 2007 CBC. All transmission facilities (lines, switchyards, switching stations, and substations) are handled in conditions of certification in the **TRANSMISSION SYSTEM ENGINEERING** section of this document.

A certified weld inspector, certified by the American Welding Society (AWS), and/or American Society of Mechanical Engineers (ASME) as applicable, shall inspect welding performed on-site requiring special inspection (including structural, piping, tanks and pressure vessels).

The special inspector shall:

1. Be a qualified person who shall demonstrate competence, to the satisfaction of the CBO, for inspection of the particular type of construction requiring special or continuous inspection;
2. Inspect the work assigned for conformance with the approved design drawings and specifications;

3. Furnish inspection reports to the CBO and RE. All discrepancies shall be brought to the immediate attention of the RE for correction, then, if uncorrected, to the CBO and the CPM for corrective action; and
4. Submit a final signed report to the RE, CBO, and CPM, stating whether the work requiring special inspection was, to the best of the inspector's knowledge, in conformance with the approved plans, specifications, and other provisions of the applicable edition of the CBC.

Verification: At least 15 days (or project owner- and CBO-approved alternative time frame) prior to the start of an activity requiring special inspection, the project owner shall submit to the CBO for review and approval, with a copy to the CPM, the name(s) and qualifications of the certified weld inspector(s), or other certified special inspector(s) assigned to the project to perform one or more of the duties set forth above. The project owner shall also submit to the CPM a copy of the CBO's approval of the qualifications of all special inspectors in the next monthly compliance report.

If the special inspector is subsequently reassigned or replaced, the project owner has five days in which to submit the name and qualifications of the newly assigned special inspector to the CBO for approval. The project owner shall notify the CPM of the CBO's approval of the newly assigned inspector within five days of the approval.

GEN-7 If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend required corrective actions. The discrepancy documentation shall be submitted to the CBO for review and approval. The discrepancy documentation shall reference this condition of certification and, if appropriate, applicable sections of the CBC and/or other LORS.

Verification: The project owner shall transmit a copy of the CBO's approval of any corrective action taken to resolve a discrepancy to the CPM in the next monthly compliance report. If any corrective action is disapproved, the project owner shall advise the CPM, within five days, of the reason for disapproval and the revised corrective action to obtain CBO's approval.

GEN-8 The project owner shall obtain the CBO's final approval of all completed work that has undergone CBO design review and approval. The project owner shall request the CBO to inspect the completed structure and review the submitted documents. The project owner shall notify the CPM after obtaining the CBO's final approval. The project owner shall retain one set of approved engineering plans, specifications, and calculations (including all approved changes) at the project site or at another accessible location during the operating life of the project. Electronic copies of the approved plans, specifications, calculations, and marked-up as-builts shall be provided to the CBO for retention by the CPM.

Verification: Within 15 days of the completion of any work, the project owner shall submit to the CBO, with a copy to the CPM, in the next monthly compliance report, (a) a written notice that the completed work is ready for final inspection, and (b) a signed statement that the work conforms to the final approved plans. After storing the final

approved engineering plans, specifications, and calculations described above, the project owner shall submit to the CPM a letter stating both that the above documents have been stored and the storage location of those documents.

Within 90 days of the completion of construction, the project owner shall provide to the CBO three sets of electronic copies of the above documents at the project owner's expense. These are to be provided in the form of "read only" (Adobe .pdf 6.0) files, with restricted (password-protected) printing privileges, on archive quality compact discs.

CIVIL-1 The project owner shall submit to the CBO for review and approval the following:

1. Design of the proposed drainage structures and the grading plan;
2. An erosion and sedimentation control plan;
3. Related calculations and specifications, signed and stamped by the responsible civil engineer; and
4. Soils, geotechnical, or foundation investigations reports required by the 2007 CBC.

Verification: At least 15 days (or project owner- and CBO-approved alternative time frame) prior to the start of site grading the project owner shall submit the documents described above to the CBO for design review and approval. In the next monthly compliance report following the CBO's approval, the project owner shall submit a written statement certifying that the documents have been approved by the CBO.

CIVIL-2 The resident engineer shall, if appropriate, stop all earthwork and construction in the affected areas when the responsible soils engineer, geotechnical engineer, or the civil engineer experienced and knowledgeable in the practice of soils engineering identifies unforeseen adverse soil or geologic conditions. The project owner shall submit modified plans, specifications, and calculations to the CBO based on these new conditions. The project owner shall obtain approval from the CBO before resuming earthwork and construction in the affected area.

Verification: The project owner shall notify the CPM within 24 hours, when earthwork and construction is stopped as a result of unforeseen adverse geologic/soil conditions. Within 24 hours of the CBO's approval to resume earthwork and construction in the affected areas, the project owner shall provide to the CPM a copy of the CBO's approval.

CIVIL-3 The project owner shall perform inspections in accordance with the 2007 CBC. All plant site-grading operations, for which a grading permit is required, shall be subject to inspection by the CBO.

If, in the course of inspection, it is discovered that the work is not being performed in accordance with the approved plans, the discrepancies shall be reported immediately to the resident engineer, the CBO, and the CPM. The

project owner shall prepare a written report, with copies to the CBO and the CPM, detailing all discrepancies, non-compliance items, and the proposed corrective action.

Verification: Within five days of the discovery of any discrepancies, the resident engineer shall transmit to the CBO and the CPM a non-conformance report (NCR), and the proposed corrective action for review and approval. Within five days of resolution of the NCR, the project owner shall submit the details of the corrective action to the CBO and the CPM. A list of NCRs, for the reporting month, shall also be included in the following monthly compliance report.

CIVIL-4 After completion of finished grading and erosion and sedimentation control and drainage work, the project owner shall obtain the CBO's approval of the final grading plans (including final changes) for the erosion and sedimentation control work. The civil engineer shall state that the work within his/her area of responsibility was done in accordance with the final approved plans.

Verification: Within 30 days (or project owner- and CBO-approved alternative time frame) of the completion of the erosion and sediment control mitigation and drainage work, the project owner shall submit to the CBO, for review and approval, the final grading plans (including final changes) and the responsible civil engineer's signed statement that the installation of the facilities and all erosion control measures were completed in accordance with the final approved combined grading plans, and that the facilities are adequate for their intended purposes, along with a copy of the transmittal letter to the CPM. The project owner shall submit a copy of the CBO's approval to the CPM in the next monthly compliance report.

STRUC-1 Prior to the start of any increment of construction of any major structure or component listed in **Facility Design Table 2** of condition of certification **GEN-2**, above, the project owner shall submit to the CBO for design review and approval the proposed lateral force procedures for project structures and the applicable designs, plans and drawings for project structures. Proposed lateral force procedures, designs, plans and drawings shall be those for the following items (from **Table 2**, above):

1. Major project structures;
2. Major foundations, equipment supports, and anchorage; and
3. Large field-fabricated tanks.

Construction of any structure or component shall not begin until the CBO has approved the lateral force procedures to be employed in designing that structure or component.

The project owner shall:

1. Obtain approval from the CBO of lateral force procedures proposed for project structures;
2. Obtain approval from the CBO for the final design plans, specifications, calculations, soils reports, and applicable quality control procedures. If

there are conflicting requirements, the more stringent shall govern (for example, highest loads, or lowest allowable stresses shall govern). All plans, calculations, and specifications for foundations that support structures shall be filed concurrently with the structure plans, calculations, and specifications;

3. Submit to the CBO the required number of copies of the structural plans, specifications, calculations, and other required documents of the designated major structures prior to the start of on-site fabrication and installation of each structure, equipment support, or foundation;
4. Ensure that the final plans, calculations, and specifications clearly reflect the inclusion of approved criteria, assumptions, and methods used to develop the design. The final designs, plans, calculations, and specifications shall be signed and stamped by the responsible design engineer; and
5. Submit to the CBO the responsible design engineer's signed statement that the final design plans conform to applicable LORS.

Verification: At least 60 days (or project owner- and CBO-approved alternative time frame) prior to the start of any increment of construction of any structure or component listed in **Facility Design Table 2** of condition of certification **GEN-2**, above, the project owner shall submit to the CBO the above final design plans, specifications and calculations, with a copy of the transmittal letter to the CPM.

The project owner shall submit to the CPM, in the next monthly compliance report, a copy of a statement from the CBO that the proposed structural plans, specifications, and calculations have been approved and comply with the requirements set forth in applicable engineering LORS.

STRUC-2 The project owner shall submit to the CBO the required number of sets of the following documents related to work that has undergone CBO design review and approval:

1. Concrete cylinder strength test reports (including date of testing, date sample taken, design concrete strength, tested cylinder strength, age of test, type and size of sample, location and quantity of concrete placement from which sample was taken, and mix design designation and parameters);
2. Concrete pour sign-off sheets;
3. Bolt torque inspection reports (including location of test, date, bolt size, and recorded torques);
4. Field weld inspection reports (including type of weld, location of weld, inspection of non-destructive testing (NDT) procedure and results, welder qualifications, certifications, qualified procedure description or number (ref: AWS); and

5. Reports covering other structural activities requiring special inspections shall be in accordance with the 2007 CBC.

Verification: If a discrepancy is discovered in any of the above data, the project owner shall, within five days, prepare and submit an NCR describing the nature of the discrepancies and the proposed corrective action to the CBO, with a copy of the transmittal letter to the CPM. The NCR shall reference the condition(s) of certification and the applicable CBC chapter and section. Within five days of resolution of the NCR, the project owner shall submit a copy of the corrective action to the CBO and the CPM.

The project owner shall transmit a copy of the CBO's approval or disapproval of the corrective action to the CPM within 15 days. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action to obtain CBO's approval.

STRUC-3 The project owner shall submit to the CBO design changes to the final plans required by the 2007 CBC, including the revised drawings, specifications, calculations, and a complete description of, and supporting rationale for, the proposed changes, and shall give to the CBO prior notice of the intended filing.

Verification: On a schedule suitable to the CBO, the project owner shall notify the CBO of the intended filing of design changes, and shall submit the required number of sets of revised drawings and the required number of copies of the other above-mentioned documents to the CBO, with a copy of the transmittal letter to the CPM. The project owner shall notify the CPM, via the monthly compliance report, when the CBO has approved the revised plans.

STRUC-4 Tanks and vessels containing quantities of toxic or hazardous materials exceeding amounts specified in the 2007 CBC shall, at a minimum, be designed to comply with the requirements of that chapter.

Verification: At least 30 days (or project owner- and CBO-approved alternate time frame) prior to the start of installation of the tanks or vessels containing the above specified quantities of toxic or hazardous materials, the project owner shall submit to the CBO for design review and approval final design plans, specifications, and calculations, including a copy of the signed and stamped engineer's certification.

The project owner shall send copies of the CBO approvals of plan checks to the CPM in the following monthly compliance report. The project owner shall also transmit a copy of the CBO's inspection approvals to the CPM in the monthly compliance report following completion of any inspection.

MECH-1 The project owner shall submit, for CBO design review and approval, the proposed final design, specifications and calculations for each plant major piping and plumbing system listed in **Facility Design Table 2**, condition of certification **GEN-2**, above. Physical layout drawings and drawings not related to code compliance and life safety need not be submitted. The submittal shall also include the applicable QA/QC procedures. Upon completion of construction of any such major piping or plumbing system, the project owner shall request the CBO's inspection approval of that construction.

The responsible mechanical engineer shall stamp and sign all plans, drawings, and calculations for the major piping and plumbing systems, subject to CBO design review and approval, and submit a signed statement to the CBO when the proposed piping and plumbing systems have been designed, fabricated, and installed in accordance with all of the applicable laws, ordinances, regulations and industry standards, which may include, but are not limited to:

- American National Standards Institute (ANSI) B31.1 (Power Piping Code);
- ANSI B31.2 (Fuel Gas Piping Code);
- ANSI B31.3 (Chemical Plant and Petroleum Refinery Piping Code);
- ANSI B31.8 (Gas Transmission and Distribution Piping Code);
- Title 24, California Code of Regulations, Part 5 (California Plumbing Code);
- Title 24, California Code of Regulations, Part 6 (California Energy Code, for building energy conservation systems and temperature control and ventilation systems);
- Title 24, California Code of Regulations, Part 2 (California Building Code); and
- Kern County codes.

The CBO may deputize inspectors to carry out the functions of the code enforcement agency.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of any increment of major piping or plumbing construction listed in **Facility Design Table 2**, condition of certification **GEN-2**, above, the project owner shall submit to the CBO for design review and approval the final plans, specifications, and calculations, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with applicable LORS, and shall send the CPM a copy of the transmittal letter in the next monthly compliance report.

The project owner shall transmit to the CPM, in the monthly compliance report following completion of any inspection, a copy of the transmittal letter conveying the CBO's inspection approvals.

MECH-2 For all pressure vessels installed in the plant, the project owner shall submit to the CBO and California Occupational Safety and Health Administration (Cal-OSHA), prior to operation, the code certification papers and other documents required by applicable LORS. Upon completion of the installation of any pressure vessel, the project owner shall request the appropriate CBO and/or Cal-OSHA inspection of that installation.

The project owner shall:

1. Ensure that all boilers and fired and unfired pressure vessels are designed, fabricated, and installed in accordance with the appropriate

section of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, or other applicable code. Vendor certification, with identification of applicable code, shall be submitted for prefabricated vessels and tanks; and

2. Have the responsible design engineer submit a statement to the CBO that the proposed final design plans, specifications, and calculations conform to all of the requirements set forth in the appropriate ASME Boiler and Pressure Vessel Code or other applicable codes.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of on-site fabrication or installation of any pressure vessel, the project owner shall submit to the CBO for design review and approval, the above listed documents, including a copy of the signed and stamped engineer's certification, with a copy of the transmittal letter to the CPM.

The project owner shall transmit to the CPM, in the monthly compliance report following completion of any inspection, a copy of the transmittal letter conveying the CBO's and/or Cal-OSHA inspection approvals.

MECH-3 The project owner shall submit to the CBO for design review and approval the design plans, specifications, calculations, and quality control procedures for any heating, ventilating, air conditioning (HVAC) or refrigeration system. Packaged HVAC systems, where used, shall be identified with the appropriate manufacturer's data sheets.

The project owner shall design and install all HVAC and refrigeration systems within buildings and related structures in accordance with the CBC and other applicable codes. Upon completion of any increment of construction, the project owner shall request the CBO's inspection and approval of that construction. The final plans, specifications and calculations shall include approved criteria, assumptions, and methods used to develop the design. In addition, the responsible mechanical engineer shall sign and stamp all plans, drawings and calculations and submit a signed statement to the CBO that the proposed final design plans, specifications and calculations conform with the applicable LORS.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of construction of any HVAC or refrigeration system, the project owner shall submit to the CBO the required HVAC and refrigeration calculations, plans, and specifications, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with the CBC and other applicable codes, with a copy of the transmittal letter to the CPM.

ELEC-1 Prior to the start of any increment of electrical construction for all electrical equipment and systems 480 Volts or higher (see a representative list, below), with the exception of underground duct work and any physical layout drawings and drawings not related to code compliance and life safety, the project owner shall submit, for CBO design review and approval, the proposed final design, specifications, and calculations. Upon approval, the

above listed plans, together with design changes and design change notices, shall remain on the site or at another accessible location for the operating life of the project. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS. All transmission facilities (lines, switchyards, switching stations, and substations) are handled in conditions of certification in the **TRANSMISSION SYSTEM ENGINEERING** section of this document.

A. Final plant design plans shall include:

1. One-line diagrams for the 13.8 kV, 4.16 kV and 480 V systems; and
2. System grounding drawings.

B. Final plant calculations must establish:

1. Short-circuit ratings of plant equipment;
2. Ampacity of feeder cables;
3. Voltage drop in feeder cables;
4. System grounding requirements;
5. Coordination study calculations for fuses, circuit breakers and protective relay settings for the 13.8 kV, 4.16 kV and 480 V systems;
6. System grounding requirements; and
7. Lighting energy calculations.

C. The following activities shall be reported to the CPM in the monthly compliance report:

1. Receipt or delay of major electrical equipment;
2. Testing or energization of major electrical equipment; and
3. A signed statement by the registered electrical engineer certifying that the proposed final design plans and specifications conform to requirements set forth in the Energy Commission decision.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of each increment of electrical construction, the project owner shall submit to the CBO for design review and approval the above listed documents. The project owner shall include in this submittal a copy of the signed and stamped statement from the responsible electrical engineer attesting compliance with the applicable LORS, and shall send the CPM a copy of the transmittal letter in the next monthly compliance report.

D.1.13 CONCLUSIONS

1. The laws, ordinances, regulations and standards (LORS) identified in the AFC and supporting documents directly apply to the project.
2. Staff has evaluated the proposed engineering LORS, design criteria, and design methods in the record, and concludes that the design, construction, and eventual closure of the project will likely comply with applicable engineering LORS.
3. The proposed conditions of certification will ensure that Ridgecrest Solar is designed and constructed in accordance with applicable engineering LORS. This will be accomplished through design review, plan checking, and field inspections that will be performed by the CBO or other Energy Commission delegate. Staff will audit the CBO to ensure satisfactory performance.
4. Though future conditions that could affect decommissioning are largely unknown at this time, it can reasonably be concluded that if, the project owner submits a decommissioning plan as required in the **General Conditions** portion of this document prior to decommissioning, decommissioning procedures will comply with all applicable engineering LORS.

Energy Commission staff recommends that:

1. The proposed conditions of certification be adopted to ensure that the project is designed and constructed in a manner that protects the public health and safety and complies with all applicable engineering LORS;
2. The project be designed and built to the 2007 CBSC (or successor standards, if in effect when initial project engineering designs are submitted for review); and
3. The CBO reviews the final designs, checks plans, and performs field inspections during construction. Energy Commission staff shall audit and monitor the CBO to ensure satisfactory performance.

D.1.14 REFERENCES

Solar Millennium2009a- Solar Millennium (tn: 52939). Application for Certification Vol 1 & 2, dated 8/24/2009.

D.2 GEOLOGY, PALEONTOLOGY AND MINERALS

Testimony of Dal Hunter, Ph.D., C.E.G.

D.2.1 SUMMARY OF CONCLUSIONS

The proposed Ridgecrest Solar Power Project is located in southern Indian Wells Valley in a geologically active area of the southwestern Basin and Range Geomorphic Province, northeastern Kern County, California. Because of its geological setting, the main geologic hazards at this site include strong ground shaking, potential hydrocompaction, and corrosive soils. These potential hazards can be effectively mitigated through facility design by incorporating recommendations contained in a design-level geotechnical report as required by the California Building Code (CBC 2007) and Condition of Certification **GEO-1**. Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the **FACILITY DESIGN** section, should also mitigate these impacts to a less than significant level (pursuant CEQA).

No significant impact (pursuant CEQA) to mineral resources is expected to result from approval of this action. Several mining claims exist outside the perimeter of the Ridgecrest Solar Power Project, but no active mining claims are presently recorded within the actual site. Four abandoned mine prospects are recorded at the hill within Section 25 of the project area, but little or no surface expression is evident. In Staff opinion the Project area has a low potential for the occurrence of minerals locatable under the Mining Law of 1872. An oil & gas lease (CACA-15765) was issued for an area three miles west of the RSPP project area in 1984, but that lease has since been relinquished and has no known production. In Staff opinion the Ridgecrest Solar Power Project area is not prospectively valuable for any leasable minerals. In 1987 the Bureau of Land Management issued a permit for disposal of mineral materials (sand, gravel, common stone) from a site within Section 35 of the project area. The site was closed in 1987 and no other disposal sites are known within the RSPP project area. In Staff opinion the Ridgecrest Solar Power Project site has a moderate potential for the occurrence of mineral materials such as fill dirt, sand and common stone. Approval of this proposed project would result in making the RSPP area unavailable for usage as a source of construction material. However, these materials are so common that this would have negligible impact to the total mineral material resources of Indian Wells Valley.

Paleontological resources have been documented within Quaternary Lake deposits associated with China Lake approximately six miles to the northeast (see **Soil and Water Resources Figure 4**). The high shoreline elevation of that prehistoric lake was at 2,240 feet (Davis 1975), while the Ridgecrest Solar Power Project is above 2,600+ feet in elevation. No important fossils were found during field explorations at the plant site, and the alluvial sediments disturbed by this proposed action are expected to have a low (surface) to high (at depth) potential for occurrence of significant fossils. If encountered, potential impacts to paleontological resources contained in these materials due to construction activities will be mitigated through worker training and monitoring by qualified paleontologists, as required by Conditions of Certification **PAL-1** through **PAL-7**.

Based on its independent research and review, the California Energy Commission believes that the potential is low for impacts to the proposed project from geological hazards during its design life and to potential geological, mineralogical, and paleontological resources from the construction, operation, and closure of the proposed project. It is staff's opinion that the Ridgecrest Solar Power Project could be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards and in a manner that would both protect environmental quality and assures public safety.

D.2.2 INTRODUCTION

In this section, California Energy Commission (CEC) staff (staff) discusses the potential impacts of geological hazards on the proposed Ridgecrest Solar Power Project (RSPP) site as well as the project's potential impacts on geological, mineralogical, and paleontological resources. Staff's objective is to ensure that there will be no consequential adverse impacts to Important geological and paleontological resources during the project construction, operation, and closure and that operation of the plant will not expose occupants to high-probability geological hazards. A brief geological and paleontological overview is provided. The section concludes with staff's proposed monitoring and mitigation measures for geological hazards and geological, mineralogical, and paleontological resources, with proposed conditions of certification.

D.2. METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

Federal agencies are required to review major federal actions such as the RSPP project under the National Environmental Policy Act (NEPA). This document has been prepared in consultation and coordination with the U.S. Bureau of Land Management (BLM) to also address federal environmental issues. The BLM and CEC have conducted a joint environmental review of the project in a single NEPA/California Environmental Quality Act (CEQA) process. The Federal Land Policy and Management Act of 1976 (FLPMA) establishes the agency's multiple-use mandate to serve present and future generations.

The CEQA Guidelines, Appendix G, provide a checklist of questions that lead agencies typically address.

- Section (V) (c) includes guidelines that determine if a project will either directly or indirectly destroy a unique paleontological resource or site or a unique geological feature.
- Sections (VI) (a), (b), (c), (d), and (e) focus on whether or not the project would expose persons or structures to geological hazards.
- Sections (X) (a) and (b) concern the project's effects on mineral resources.

The California Building Standards Code (CBSC) and CBC (2007) provide geotechnical and geological investigation and design guidelines, which engineers must follow when designing a facility. As a result, the criteria used to assess the significance of a geological hazard include evaluating each hazard's potential impact on the design and

construction of the proposed facility. Geological hazards include faulting and seismicity, volcanic eruptions, liquefaction, dynamic compaction, hydrocompaction, subsidence, expansive soils, landslides, tsunamis, and seiches. Of these, dynamic compaction, hydrocompaction, subsidence, and expansive soils are geotechnical engineering issues but are not normally associated with concerns for public safety.

Staff has reviewed geological and mineral resource maps for the surrounding area, as well as site-specific information provided by the applicant, to determine if any geological and mineralogical resources exist in the area and to determine if operations could adversely affect such geological and mineralogical resources.

To evaluate whether the proposed project and alternatives would generate a potentially significant impact as defined by CEQA on mineral resources, the staff evaluated them against checklist questions posed in the 2006 CEQA Guidelines, Appendix G, Environmental Checklist established for Mineral Resources. These questions are:

- A. Would the project result in the loss of availability of a known mineral resource that would be of value to the region and residents of the state?
- B. Would the project result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?

Under NEPA, the impact of the proposed project and alternatives on mineral resources would be considered important if they would directly or indirectly interfere with active mining claims or operations, or would result in reducing or eliminating the availability of important mineral resources. The staff's evaluation of the significance of the impact of the proposed project on mineral resources includes an assessment of the context and intensity of the impacts, as defined in the NEPA implementing regulations 40 CFR Part 1508.27.

The Antiquities Act of 1906 (16 United States Code [USC]) requires that objects of antiquity be taken into consideration for federal projects and the California Environmental Quality Act, Appendix G, also requires the consideration of paleontological resources. The Paleontological Resources Preservation Act of 2009 requires the Secretaries of the United States Department of the Interior and Agriculture to manage and protect paleontological resources on Federal land using scientific principles and expertise. The potential for discovery of important paleontological resources or the impact of surface disturbing activities to such resources is assessed using the Potential Fossil Yield Classification (PFYC) system contained within BLM Instruction Memorandum No. 2009-011. This system includes three conditions (Condition 1 [areas known to contain vertebrate fossils]; Condition 2 [areas with exposures of geological units or settings that have high potential to contain vertebrate fossils]; and Condition 3 [areas that are very unlikely to produce vertebrate fossils]). The PFYC class ranges from Class 5 (very high) to Class 1 (very low) (USDI 2007).

Staff reviewed existing paleontological information and requested a records search from the Natural History Museum of Los Angeles County (NHMLA) for the site area. Site-specific information generated by the applicant for the RSPP was also reviewed. All research was conducted in accordance with accepted assessment protocol (SVP 1995)

to determine whether any known paleontological resources exist in the general area. If present or likely to be present, conditions of certification which outline required procedures to mitigate impacts to potential resources, are proposed as part of the project's approval.

The proposed conditions of certification allow BLM's Authorized Officer, the Energy Commission's compliance project manager (CPM) and the applicant to adopt a compliance monitoring scheme ensuring compliance with laws, ordinances, regulations, and standards (LORS) applicable to geological hazards and the protection of geological, mineralogical, and paleontological resources.

Based on the information below, it is staff's opinion that the potential for significant adverse impacts (pursuant CEQA) to the project from geological hazards, and to potential geological, mineralogical, and paleontological resources from the proposed project, is low.

D.2.3.1 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Applicable LORS are listed in the application for certification (AFC) (SM 2009a). The following briefly describes the current LORS for both geological hazards and resources and mineralogical and paleontological resources.

Geology and Paleontology Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Antiquities Act of 1906 (16 United States Code [USC], 431-433)	The proposed RSPP facility site is located entirely on land currently administered by the Bureau of Land Management (BLM). Although there is no specific mention of natural or paleontological resources in the Act itself, or in the Act's uniform rules and regulations (Title 43 Part 3, Code of Federal Regulations [43 CFR Part 3], 'objects of antiquity' has been interpreted to include fossils by the Federal Highways Act of 1956, the National Park Service (NPS), the BLM, the Forest Service (USFS), and other Federal agencies.
National Environmental Policy Act (NEPA) of 1970 (42 USC 4321, et. seq.)	Established the Council on Environmental Quality (CEQ), which is charged with preserving 'important historic, cultural, and natural aspects of our national heritage'.
Federal Land Policy and Management Act (FLPMA) of 1976 (43 USC 1701-1784)	Authorizes the BLM to manage public lands to protect the quality scientific, scenic, historical, archeological, and other values, and to develop 'regulations and plans for the protection of public land areas of critical environmental concern', which include 'important historic, cultural or scenic values'. Also charged with the protection of 'life and safety from natural hazards'.
Paleontological Resources Preservation Act (PRPA) (Public Law [PL] 111-011)	Authorizes Departments of Interior and Agriculture Secretaries to manage the protection of paleontological resources on Federal lands.
National Historic Preservation Act of 1966 (NHPA) (16 USC 470)	Establishes policies for the 'preservation of the prehistoric and historic resources of the United States', under the direction of the Secretary of the Interior and the BLM.
General Mining Law of 1872	Declares all valuable mineral deposits in lands belonging to the United States to be free and open to exploration and purchase.
Mineral Leasing Act of 1920	Authorizes the leasing of coal, oil & gas, phosphate, sodium and oil shale from public lands in return for payment of a royalty rate on production.
Materials Act of July 31, 1947	Authorizes the sale of certain materials from the public lands including sand, stone, gravel, and common clay.
State	
California Building Code (CBC), 2007	The CBC (2007) includes a series of standards that are used in project investigation, design, and construction (including grading and erosion control).

Applicable Law	Description
Alquist-Priolo Earthquake Fault Zoning Act, Public Resources Code (PRC), section 2621–2630	Mitigates against surface fault rupture of known active faults beneath occupied structures. Requires disclosure to potential buyers of existing real estate and a 50-foot setback for new occupied buildings. Portions of the site and proposed ancillary facilities are located within designated Alquist-Priolo Fault Zones. The proposed site layout places occupied structures outside of the 50-foot setback zone.
The Seismic Hazards Mapping Act, PRC Section 2690–2699	Areas are identified that are subject to the effects of strong ground shaking, such as liquefaction, landslides, tsunamis, and seiches.
PRC, Chapter 1.7, sections 5097.5 and 30244	Regulates removal of paleontological resources from state lands, defines unauthorized removal of fossil resources as a misdemeanor, and requires mitigation of disturbed sites.
Warren-Alquist Act, PRC, sections 25527 and 25550.5(i)	The Warren-Alquist Act requires the Energy Commission to “give the greatest consideration to the need for protecting areas of critical environmental concern, including, but not limited to, unique and irreplaceable scientific, scenic, and educational wildlife habitats; unique historical, archaeological, and cultural sites.” With respect to paleontological resources, the Energy Commission relies on guidelines from the Society for Vertebrate Paleontology, indicated below.
California Environmental Quality Act (CEQA), PRC sections 15000 et seq., Appendix G	Mandates that public and private entities identify the potential impacts on the environment during proposed activities. Appendix G outlines the requirements for compliance with CEQA and provides a definition of significant impacts on a fossil site.
Society for Vertebrate Paleontology (SVP), 1995	The “Measures for Assessment and Mitigation of Adverse Impacts to Non-Renewable Paleontological Resources: Standard Procedures” is a set of procedures and standards for assessing and mitigating impacts to vertebrate paleontological resources. The measures were adopted in October 1995 by the SVP, a national organization of professional scientists.
Local	
Kern County Grading Code, (Ord. 17.28.040, 2008)	Kern County grading permit is required for earth moving activities in excess of 50 cubic yards.
Kern County Floodplain Management Ordinance, (Ord. 17.48.140, 2008)	A Kern County development permit is required prior to construction or development within an area of special flood hazards, areas of flood related erosion hazards, or areas of potential mudslides.

D.2.4 PROPOSED PROJECT

D.2.4.1 SETTING AND EXISTING CONDITIONS

The proposed RSPP project would be constructed on 1,760 acres within a 3,920-acre parcel south of U.S. Highway 395 and approximately 5 miles southwest of the city of Ridgecrest, Kern County, California. The finished facility footprint would occupy approximately 1,440 acres. Access is obtained from South Brown Road which crosses the approximate middle of the proposed site from southeast to northwest. The site is relatively flat with elevations ranging from approximately 2,820 in the southeast to 2,620 feet at the northwestern boundary. Storm water runoff flows from the south and southeast across the proposed site to the north in several shallow drainage channels.

Indian Wells Valley is an enclosed drainage basin in the southwest portion of the Basin and Range Geomorphic Province. Drainage within the enclosed basin occurs along ephemeral streams which flow toward the normally dry lakebed of China Lake at the eastern margin of the valley approximately 10 miles northeast of the site. The site is located on undeveloped land which is managed by the BLM. An SCE power line crosses the site from north to south along the proposed sites western boundary.

The proposed site is located in the south-central portion of Indian Wells Valley, an enclosed drainage basin located in the southwest corner of the Basin and Range physiographic province in Southern California. The Basin and Range province occupies most of the west-central portion of the United States. Stretching from the Sierra Nevada Mountains in eastern California to the Wasatch Front in eastern Utah and from Idaho in the north to northern Mexico in the south, the province is characterized by extensional horst and graben structure formed by north to northwest-trending subparallel normal faulting which has resulted in steep-sided mountain ranges separating deep alluvium filled valleys. The proposed RSPP site lies near the extreme southwest corner of the Basin and Range province where it is bounded on the west by the Southern Sierra Nevada Fault system which separates it from the Sierra Nevada geomorphic province, and on the south by the Garlock Fault which separates the Basin and Range province from the Mojave Desert province.

Indian Wells Valley is a fluvially isolated intermontane basin approximately 22 miles long and 18 miles wide. The valley is bounded on the north by the Coso Range, on the east by the Argus Range, on the west by the Sierra Nevada mountains, and on the south by the El Paso Mountains and the relatively low relief Spangler and Rademacher Hills (Dutcher and Moyle Jr. 1974). The surrounding mountains are composed primarily of Mesozoic plutonic basement rocks typical of the Sierra Nevada although the Coso Range has a significant Pleistocene volcanic cap of basaltic and rhyolitic flows and pyroclastic rocks. The valley floor is composed of recent alluvium of fluvial and lacustrine origin with sediments derived primarily from the Sierra Nevada to the west and the Argus Range to the east. Scattered eolian deposits in the form of dune sand are also present. The depth of valley fill alluvium is not well constrained in the proposed project area, however, deep drilling north of Ridgecrest has shown valley fill sediments are highly variable in thickness, ranging from approximately 2,300 feet to more than

7,200 feet thick. Seismic, stratigraphic, and gravimetric correlation suggest the variations in valley fill thickness are most closely related to offset along high angle north to northeast-striking subsurface structures (Monastero et al. 2002).

Most of the surface of Indian Wells Valley is Quaternary alluvium which is composed of Holocene alluvial fan, fluvial, and lacustrine deposits, and Pleistocene Older Alluvium deposits of similar origin. Valley fill alluvial deposits are made up of unconsolidated gravel, sand, and silt mixtures, as well as lacustrine silts and clays, eroded primarily from the Sierra Nevada and Argus Mountain Ranges. Where present, the Holocene deposits grade vertically into Pleistocene age alluvium and/or lakebed deposits. In the southernmost portion of the valley, Quaternary alluvium is underlain at an unknown depth by intrusive and extrusive flows of the Plio-Pleistocene Black Mountain Basalt. The Black Mountain Basalt is an olivine-rich vesicular unit which is often more than 100 feet thick and originally covered at least 50 square miles including the proposed project area. Subsequent erosion has removed most of the Black Mountain Basalt from the area and it now outcrops only to the southwest of the proposed RSPP site (Kunkel and Chase 1969).

In the central part of the valley, Black Mountain Basalt and Quaternary older alluvium unconformably overly Tertiary (Paleocene to Pliocene) continental deposits of the Ricardo Group. The Ricardo Group is up to 7,000 feet thick and is composed of an upper unit of terrestrial and lacustrine deposits known as the White Hills Sequence. The upper unit overlies an interbedded middle unit made up of clastic terrestrial rocks, lava flows, volcanic conglomerate, and pyroclastic sedimentary rocks referred to as the Dove Spring Formation. The Dove Spring Formation overlies a lower unit of arkosic conglomerate known as the Cudahy Camp Formation. The Dove Spring and Cudahy Camp Formations are very thin or absent along the western margin of the valley where coarse sediments eroded from the adjacent Sierra Nevada range dominate the depositional history of the basin.

The Ricardo Group unconformably overlies up to approximately 6,500 feet of Tertiary Goler Formation. The Goler Formation is divided into upper and lower members. The upper member is made up of approximately 4,000 feet of interbedded sand, clay, and gravel overlying 2,000 feet of clay and sand. The lower member is composed of approximately 500 feet of unsorted conglomerate made up of well rounded boulders and cobbles up to 2 feet in diameter derived from granitic, sedimentary, and porphyritic sources. The Goler Formation unconformably overlies the granitic basement complex (Monastero et al. 2002).

D.2.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section considers two types of impacts. The first is geological hazards, which could impact the proper functioning of the proposed facility and create life/safety concerns. The second is the potential impacts the proposed facility could have on existing geological, mineralogical, and paleontological resources in the area.

D.2.4.2.1 Direct/Indirect Impacts and Mitigation

Ground shaking, potential hydrocompaction, and corrosive soils represent the main geologic hazards at the proposed site. These potential hazards could be effectively

mitigated through facility design by incorporating recommendations contained in the project geotechnical evaluation as required by **GEO-1**. Proposed Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the **Facility Design** section should also mitigate these impacts to a less than significant level (pursuant CEQA)

The proposed RSPP site is not located within an established Mineral Resource Zone (MRZ) and no economically viable mineral deposits are known to be present at the site.

The proposed site is in close proximity to the southern margin of Indian Wells Valley. Most of the proposed project site surface has been mapped as Quaternary older alluvium composed of Pleistocene alluvial fan and colluvium deposits with recent (Holocene) alluvial deposits occurring as channel fill in the bottom of shallow drainages (Dibblee 2008). A small bedrock outcrop is present near the southeast corner of the proposed RSPP site and is shown on regional geological maps as Jurassic granite (CDMG 1962a) and on the larger scale geological map as quartz monzonite porphyry (Dibblee 2008). The presence of plutonic outcrop within the proposed project boundaries indicates that crystalline basement rock is present at a shallow depth in, at least, that portion of the proposed site and may be present at relatively shallow depths beneath most or all of the site. Plio-Pleistocene Black Mountain Basalt outcrops at the southwest border of the proposed site and may also be present at a shallow depth beneath some or all of the site. Continental deposits of the Ricardo Group and Goler Formation may be very thin or absent beneath the proposed site footprint.

The site surface is composed primarily of Pleistocene-age Older Alluvium. Although no fossils were discovered during the paleontological resource assessment, Older Alluvium has yielded significant fossil remains elsewhere in the valley. Therefore, staff considers the probability for significant paleontological resources to be encountered during site construction activities to be high. A high paleontological sensitivity roughly corresponds to PFYC Condition 2, Class 4a at this site. If construction includes significant amounts of grading or deep foundation excavation and utility trenching the potential for exposure of paleontological resources will increase with depth of the excavations. This assessment is based on SVP criteria and the paleontological report appended to the AFC (SWCA 2009). Proposed Conditions of Certification **PAL-1** to **PAL-7** are designed to mitigate paleontological resource impacts, as discussed above, to less than significant levels (pursuant CEQA). These conditions essentially require a worker education program in conjunction with the monitoring of earthwork activities by a qualified professional paleontologist (a paleontological resource specialist [PRS]).

The proposed conditions of certification allow the Energy Commission's CPM and the applicant to adopt a compliance monitoring scheme ensuring compliance with LORS applicable to geological hazards and the protection of geological, mineralogical, and paleontological resources.

Based on the information below, it is staff's opinion that the potential for significant adverse, direct or indirect impacts (pursuant CEQA) of the project, from geological hazards, and to potential geological, mineralogical, and paleontological resources is low.

Geological Hazards

The AFC provides documentation of potential geological hazards at the proposed RSPP plant site, including limited site-specific subsurface information (SM 2009a). Review of the AFC, coupled with staff's independent research, indicates that the potential for geological hazards to impact the proposed plant site during its practical design life is low if recommendations for mitigation of seismic shaking are followed. Geological hazards related to seismic shaking are addressed in the project geotechnical report per CBC (2007) requirements (Kleinfelder 2009).

Staff's independent research included the review of available geological maps, reports, and related data of the RSPP plant site. Geological information was available from the California Geological Survey (CGS), California Division of Mines and Geology (CDMG, now known as CGS), the U.S. Geological Survey (USGS), the American Geophysical Union, the Geological Society of America, and other organizations.

Faulting and Seismicity

Energy Commission staff reviewed numerous CDMG and USGS publications as well as informational websites in order to gather data on the location, recency, and type of faulting in the project area. Type A and B faults within 75 miles of the proposed RSPP site are listed in **Geology and Paleontology Table 2**. Type A faults have slip-rates of ≥ 5 mm per year and are capable of producing an earthquake of magnitude 7.0 or greater. Type B faults have slip-rates of 2 to 5 mm per year and are capable of producing an earthquake of magnitude 6.5 to 7.0. The fault type, potential magnitude, and distance from the site are summarized in **Geology and Paleontology Table 2**.

Geology and Paleontology Table 2
Active Faults Relative to the Proposed RSPP Site

Fault Name	Distance From Site (miles)	Maximum Earthquake Magnitude (Mw)	Estimated Peak Site Acceleration (g)	Movement and Strike	Slip Rate mm/yr	Fault Type
Southern Sierra Nevada	5.3	7.5	0.550	Normal (North to Northeast)	0.1	B
Garlock – Central Strand (Includes El Paso Fault)	8.8	7.5	0.368	Left-Lateral Strike Slip (West-Southwest)	5 - 7	A
Little Lake	9.1	6.9	0.262	Right-Lateral Strike Slip (Northwest)	0.7	B
Blackwater	19.9	7.1	0.164	Right-Lateral Strike Slip (Northwest)	0.6	B
Lenwood-Lockhart-Old Woman Springs	23.5	7.5	0.179	Right-Lateral Strike Slip (Northwest)	0.6	B
Garlock - West Strand (Also known as the Cantil Fault)	25.0	7.3	0.154	Left-Lateral Strike Slip (Southwest)	6	B
Tank Canyon	25.2	6.4	0.116	Normal (Northwest)	1.0	B
Gravel Hills – Harper Lake	26.5	7.1	0.133	Right-Lateral Strike Slip (Northwest)	0.6	B
Helendale – South Lockhart	37.0	7.3	0.114	Right-Lateral Strike Slip (Northwest)	0.6	B
Panamint Valley	37.3	7.4	0.119	Right-Lateral Normal Oblique Slip (Northwest)	2.5	A
White Wolf	39.6	7.3	0.131	Left-Lateral Reverse/Oblique Slip (West)	2.0	B
Garlock – East Strand	40	7.5		Left-Lateral Strike Slip (West)	7	B
Owens Valley	45.8	7.6	0.113	Right-Lateral Strike Slip (Northwest)	1.5	B
Owl Lake	48.7	6.5	0.060	Left-Lateral Strike Slip	2.0	B
Calico – Hidalgo	60.4	7.3	0.078	Right-Lateral Strike Slip (Northwest)	0.6	B
Death Valley (graben)	61.8	7.1	0.084	Normal (North)	4.0	B
Death Valley (south)	63.7	7.1	0.067	Right-Lateral Strike Slip (Northwest)	4.0	B
Hunter Mtn. – Saline Valley	65.6	7.2	0.069	Right-Lateral, Normal, Oblique Slip (Northwest)	2.5	B
Independence	68.0	7.1	0.078	Normal (North)	0.2	B
San Andreas – Whole M-1a	72.1	8.0	0.098	Right-Lateral Strike Slip (Northwest)	34.0	A
San Andreas – Mojave M-1c-3	72.1	7.4	0.072	Right-Lateral Strike Slip (Northwest)	30.0	A
San Andreas – Cholame-Mojave M-1b-1	72.1	7.8	0.088	Right-Lateral Strike Slip (Northwest)	34.0	A
Landers	73.4	7.3	0.067	Right-Lateral Strike Slip (Northwest)	0.6	B
San Andreas – Carrizo M-1c-2	73.5	7.4	0.071	Right-Lateral Strike Slip (Northwest)	34.0	A

Type C and otherwise undifferentiated faults which are more than 20 miles from the site are not discussed here because they are unlikely to undergo movement or generate seismicity which could affect the project.

Twenty three Type A and B faults and fault segments were identified within 75 miles of the potential RSPP site (**Geology and Paleontology Table 2**). In addition the Airport Fault is within close proximity to the site, and an unnamed fault which shows no surface expression or apparent active seismicity, may be present at depth beneath the proposed site (CDMG 1962a). The Airport Fault is a north-trending active seismic zone approximately 12 miles northeast of the proposed RSPP site. The zone is approximately 9 miles wide and 22 miles long, extending from the Little Lake fault zone in central Indian Wells Valley north to the northern end of the valley. The southern end of the Airport fault intersects complexly with the northwest-striking Little Lake fault zone and has been the site of several earthquake swarms since 1980. The most notable swarm began on August 17, 1995 when a magnitude 5.4 earthquake with an epicenter approximately 10 miles north of Ridgecrest shook the valley and spawned thousands of aftershocks including a magnitude 5.8 on September 20, 1995. Several thousand more aftershocks have been recorded in the area since the 1995 swarm (SCEC 2006).

One Type A and 2 Type B faults are known to exist close enough to the proposed RSPP site to be capable of causing substantial ground shaking. These are the Southern Sierra Nevada fault zone, the aforementioned Little Lake fault zone, and the central strand of the Garlock Fault. The Southern Sierra Nevada fault is comprised of several high-angle normal and right-lateral dip-slip faults that form the eastern front of the Sierra Nevada and, in the proposed project area, define the separation between the Basin and Range geomorphic province and the Sierra Nevada province. No detailed studies of the fault have been conducted. However, the fault is marked by prominent scarps, some approaching 6,000 feet in relief. The most recent movement on the Southern Sierra Nevada fault zone is thought to have been in the late Pleistocene (Sawyer 1995).

The Little Lake fault zone is located approximately 7 miles north of the proposed project site. This fault zone is a northwest-striking right-lateral fault zone with a lesser normal-slip component which may be accommodating a major part of the right-slip motion of the Sierra Nevada fault zone in Indian Wells Valley area (Bhattacharyya and Lees 2002). Like the Airport fault zone the Little Lake fault zone is seismically active and subject to periodic earthquake swarms.

The proposed RSPP site is located approximately 9 miles north of the central strand of the regional Garlock Fault system. The Garlock fault is one of the most active fault systems in southern California. South of the proposed project area it marks the boundary between the Basin and Range geomorphic province and the Mojave Desert province. Regionally the Garlock Fault is unique in that it is perhaps the only major fault system in the eastern California shear zone which exhibits northeast to east-striking left-lateral displacement versus the right-lateral northwest-trending nature of major faults within the Mojave Desert province and the north-trending normal faulting which predominates Basin and Range extensional faulting. Tectonically the Garlock Fault appears to be an intracontinental transform structure accommodating shear between

two crustal blocks, one hosting Basin and Range extensional faulting and the other hosting right-lateral shear related to San Andreas fault plate margin movement (Davis and Burchfiel 1973).

The USGS and other agencies have divided the Garlock fault into 3 segments based on geographic setting and frequency of fault activity. The central strand of the Garlock fault is closest to the site and recent studies indicate it is the only segment of the Garlock Fault which shows Holocene movement although the western segment may be undergoing aseismic creep (Pampeyan, Holzer, and Clark 1988). Staff has assigned the central segment classification Type A based of its reported slip rate of 5 to 7 mm per year, (McGill and Sieh 1993), and potential to produce a magnitude 7.0 or greater earthquake (McGill and Rockwell, 1998). If the western and eastern segments of the Garlock Fault have the slip rates and maximum magnitudes assigned them by the CGS (2002b), they too could be considered to be Type A faults.

The western segment of the Garlock fault extends northeast from the San Andreas Fault at the base of the Transverse Ranges to the eastern side of Koehn Lake in Fremont Valley, approximately 14 miles southwest of the proposed site. Within Fremont Valley, the Garlock Fault offsets to the west across the width of the valley to form the southwestern end of the central segment. This means much of the Fremont Valley, including Koehn Lake, lies in an approximately 2-mile-wide, down-to-the-north block formed by the extensional step-over between the western and central segments (McGill and Rockwell 1998). The central segment of the Garlock fault originates on the west side of Fremont Valley near the base of the El Paso Mountains and arcs northeast approximately 65 miles to a splayed en-echelon hinge zone at the southern end of the Quail Mountains which defines the northeastern end of the central fault segment (Zellmer, Roquemore, and Blackerby 1985). South of the Quail Mountains the Garlock Fault bends 15 degrees to the east and the eastern segment strikes nearly east-west for 34 miles to terminate in the Avawatz Mountains at the southern end of Death Valley (McGill and Rockwell 1998).

Although the fault has not produced any large historic earthquakes, geomorphic and stratigraphic evidence indicates it has done so in the past and approximately 30 to 40 miles of left lateral offset has been documented along the fault since its activation during the late Miocene approximately 7 million years (My) ago (Dawson, McGill, and Rockwell 2003). The most recent documented fault movement occurred along the Central Garlock Fault segment south of the proposed project site between approximately 200 to 550 years before present (McGill and Rockwell 1998).

Holocene movement has been demonstrated on the central segment of the Garlock fault (Dawson, McGill, and Rockwell 2003, and McGill and Sieh 1991). In the area of Koehn Lake at least 5 and possibly as many as 8 surface ruptures have been documented on the central Garlock fault in the last 5,000 years. The average recurrence rate is apparently irregular but is believed to be in the range of 700 to 1,200 years (McGill and Rockwell 1998).

All of the faults listed in **Geology and Paleontology Table 2** could generate some level of ground shaking at this site. Since there are no known faults of any age through the site, the potential for actual seismic ground surface rupture is negligible.

Based on previous geotechnical investigation and on the soil profile generated for this site by the geotechnical investigation, the site soil class is assumed to be seismic Class D. The estimated peak horizontal ground acceleration for the power plant is 0.55 times the acceleration of gravity (0.55g) for bedrock acceleration based on 2 percent probability of exceedence in 50 years under 2007 CBC criteria. For a Class D site, the soils profile amplifies the peak horizontal acceleration at the ground surface to 0.877g (USGS 2008).

The effects of ground shaking, which would most likely include aesthetic damage and slight damage to structural connections, would need to be mitigated, to the extent practical, through structural designs required by the CBC (2007) and the site-specific project geotechnical report required by the CBC and Condition of Certification **GEN-1**.

Liquefaction

Liquefaction is a condition in which a saturated cohesionless soil may lose shear strength because of sudden increase in pore water pressure caused by an earthquake. However, the potential for liquefaction of strata deeper than approximately 40 feet below surface is considered negligible due to the increased confining pressure and because geological strata at this depth are generally too compact to liquefy. The reported deep ground water table (greater than 50 feet) would indicate no potential for liquefaction. Standard penetration testing (blowcounts) reported in the project-specific geotechnical report (Kleinfelder 2009) indicate strata beneath the proposed site are also generally too dense to liquefy. Liquefaction potential on the proposed RSPP site was addressed in the preliminary project geotechnical report per CBC (2007) and proposed Condition of Certification **GEN-1** requirements.

Lateral Spreading

Lateral spreading of the ground surface can occur within liquefiable beds during seismic events. Lateral spreading generally requires an abrupt change in slope—that is, a nearby steep hillside or deeply eroded stream bank, etc.—but can also occur on gentle slopes such as are present at the project site. Other factors such as distance from the epicenter, magnitude of the seismic event, and thickness and depth of liquefiable layers also affect the amount of lateral spreading. Because the proposed RSPP site is not subject to substantial liquefaction, there is no potential for lateral spreading at the site surface during seismic events.

Dynamic Compaction

Dynamic compaction of soils results when relatively unconsolidated granular materials experience vibration associated with seismic events. The vibration causes a decrease in soil volume, as the soil grains tend to rearrange into a more dense state (an increase in soil density). The decrease in volume can result in settlement of overlying structural improvements. Site specific geotechnical investigation indicates the alluvial deposits in the site subsurface are generally too dense to undergo substantial dynamic compaction (Kleinfelder 2009).

Hydrocompaction

Hydrocompaction (also known as hydro-collapse) is generally limited to young soils that were deposited rapidly in a saturated state, most commonly by a flash flood. The soils dry quickly, leaving an unconsolidated, low density deposit with a high percentage of voids. Foundations built on these types of compressible materials can settle excessively, particularly when landscaping irrigation dissolves the weak cementation that is preventing the immediate collapse of the soil structure. Site specific geotechnical investigation indicates the subsurface alluvial deposits which underlie the site are generally too dense to experience significant hydrocompaction (Kleinfelder 2009), although the preliminary geotechnical report for this project recommends additional analysis during final design. The potential for and mitigation of the effects of hydrocompaction of site soils should be addressed in a project-specific geotechnical report as required by the CBC (2007) and proposed Condition of Certification **GEO-1**. Typical mitigation measures would include over-excavation/replacement, mat foundations or deep foundations depending on severity and foundation loads.

Subsidence

Local subsidence or settlement may occur when areas containing compressible soils are subjected to foundation or fill loads. Site-specific geotechnical investigation indicates the alluvial deposits which underlie the proposed site are generally at a medium-dense to very dense consistency and therefore are considered unlikely to support site-wide subsidence due to foundation loading.

Regional ground subsidence is typically caused by petroleum or ground water withdrawal that increases the effective unit weight of the soil profile, which in turn increases the effective stress on the deeper soils. This results in consolidation or settlement of the underlying soils. No petroleum or natural gas withdrawals are taking place in the site vicinity and no ground water would be pumped at the site. Therefore, negative impacts to the proposed project due to subsidence from tectonism or from future petroleum, natural gas, or water extraction is considered very unlikely.

Expansive Soils

Soil expansion occurs when clay-rich soils with an affinity for water exist in place at a moisture content below their plastic limit. The addition of moisture from irrigation, precipitation, capillary tension, water line breaks, etc. causes the clay minerals to absorb water molecules into their structure, which results in an increase in the overall volume of the soil. This increase in volume can cause excessive movement (heave) of overlying structural improvements. Soils encountered during the initial site geotechnical investigation do not appear to be prone to significant expansion (Kleinfelder 2009). An inspector experienced in recognition of clay-rich soils should be available during excavation of building foundations to implement routine mitigation measures in areas of clay-rich soils, if they are encountered.

Corrosive Soils

Fine grain soils with high in-situ moisture contents that contain sulfides can be corrosive to buried metal pipe, which can lead to premature pipe failure and leaking. Such soils are present at this site, and the preliminary geotechnical investigation (Kleinfelder 2009)

indicates that site soils could be potentially corrosive to metal pipe. The effects of corrosive soils can be effectively mitigated through final design by incorporating the recommendations of the site-specific project geotechnical report required by the CBC and Condition of Certification **GEO-1**. Mitigation of corrosive soils with respect to metal pipe typically involves cathodic protection or polyethylene encasement of the pipe.

Landslides

The proposed RSPP site slopes gently to the north at a gradient of less than 1 percent. Due to the low site gradient and the absence of topographically high ground in the site vicinity the potential for landslide impacts to the site is considered to be negligible.

Flooding

The Federal Emergency Management Agency (FEMA) has identified the majority of the proposed RSPP site and ancillary facilities areas as lying in Unshaded Zone X, or “Areas determined to be outside the 0.2 percent annual chance floodplain”. However, the channels and surrounding banks of ephemeral drainages which cross the site are designated special flood hazard areas subject to inundation by the 1 percent annual chance flood (FEMA 2008). Civil engineering design can minimize the potential for flash floods damage to this project to a (CEQA) less than significant level. Additional discussion of flash flooding and associated mitigation is presented under the **SOIL AND WATER RESOURCES** section C.9 of this document.

Tsunamis and Seiches

The proposed RSPP and associated linear facilities are not located near any substantial surface water bodies and therefore there are no potential impacts due to tsunamis and seiches.

Volcanic Hazards

The proposed RSPP project site is located approximately 26 miles southeast of the Volcano Peak volcanic vent area. Volcano Peak is an area in the southern part of the Coso Range where explosive and extrusive rhyolitic, andesitic, and basaltic eruptions occurred as recently as the late Pleistocene. No recurrence interval for eruptions in the Volcano Peak area has been determined and it is not known if it conducive to further eruptive activity in the future (Miller 1989). Due to its distance from the project site the impact of eruptive activity in the Volcano Peak area would likely be limited to ashfall which would have a minor, short-lived affect on the proposed project. This would involve having to shut down and probably cover the generators to prevent damage from the abrasive ash and having to clean the mirrors once the eruption was over. Mirrors will need to be cleaned periodically as part of normal plant operation and maintenance.

Due to the distance of the site from known Holocene volcanic areas and the likely long recurrence intervals between eruptions the potential for volcanic eruptions to cause long term or catastrophic damage to the RSPP project is considered low.

Geological, Mineralogical and Paleontological Resources

Geological and Mineralogical Resources

Energy Commission staff has reviewed applicable geological maps, reports, and on-line resources for this area (Blake 2006; CDMG 1962a and b; CDMG 1990; CDMG 1994; CDMG 1999; CDMG 2003; CGS 2002a and b; CGS 2007; Jennings and Saucedo 2002; SCEC 2006; and USGS 2006).

Staff did not identify any geological or mineralogical resources at the proposed energy facility location. The Rademacher Gold District is present within the Mesozoic granitic outcrop immediately southeast of the proposed site (CDMG 1998). This district includes at least 25 former gold mines; however, none are active at this time. The USGS topographic map for the Ridgecrest South quadrangle (USGS 1973) indicates four former mining prospects are present near the granitic outcrop present in the southeast corner of the proposed RSPP site but no production is known to have occurred on the site.

Four mining claims are currently located within 1/2 mile of the boundaries of the RSPP. The owner of a valid mining claim is entitled to an enforceable right to enter public lands and develop valuable minerals under the Mining Law of 1872. Those, subject to regulation by the BLM under the Surface Management regulations in Title 43, Subpart 3809 of the Code of Federal Regulations. The BLM has received no application to develop any mining claim adjacent to the RSPP project area. No mining claims are registered within the RSPP as of this writing. Most of the lands described by this proposal are covered by Quaternary alluvium generally having a low potential for the occurrence of gold, silver or other valuable minerals.

While this project area has a low potential for gold or silver, it has at least a moderate potential for the occurrence of construction materials subject to the Materials Act of 1947. That Act governs the disposal of common mineral materials from the public lands such as sand, fill materials and building stone. Records show that one sale or disposal was made from the southeast portion of the project area in 1987 (CACA-19764). No sale or permit has been issued from the project area since that time. Substantially identical materials are available in large supply from other nearby public lands. For that reason, Staff feels that the amount of mineral material in this project area is negligible compared to the total amount contained in Indian Wells Valley.

In 1984 a lease for oil & gas was issued within this same township three miles west of the RSPP project area (Oil&Gas lease CACA-15765). It was relinquished in 1992 with no known history of production. No mineral leases have been issued in the nearby area since that time. No formations containing oil, gas, coal, sodium or other leasable minerals are presently known to occur within the project area. In Staff's opinion these Federal lands are not prospectively valuable for any leasable minerals.

Paleontological Resources

Energy Commission staff reviewed the paleontological resources assessment in Section 5.9 and Appendix H of the AFC (SM 2009a) and the paleontological resources assessment (SWCA 2009). Staff has also reviewed paleontological literature and

records searches conducted by the NHMLA (McLeod 2009). These studies indicate the Quaternary alluvium and colluvium within and near the proposed project site does not contain abundant fossils. However, the Quaternary older alluvium at depth below the surface may contain vertebrate and plant remains. Numerous vertebrate fossil localities have been documented in lake bed deposits adjacent to China Lake (see deposits labeled QI in **Soil and Water Resources Figure 4**). The shoreline of the ancient China Lake reached an elevation of 2,240 feet (Davis 1975), while the RSPP is at an elevation of 2,600 feet and greater. The field survey of the affected area states that “Older lake deposits may or may not be present at depth within the RSPP site and it should be noted that the China Lake localities were discovered at a much lower elevation.” Therefore, the paleontological sensitivity of alluvium at the surface within the proposed project boundaries is considered to be low. Sensitivity of alluvial deposits at depth (greater than 10 feet) is considered to be high (SWCA 2009). Highly sensitive roughly corresponds to PFYC Condition 2, Class 4a at this site.

This assessment is based on SVP criteria, the paleontological report appended to the AFC (SWCA 2009), and the independent paleontological assessment of McLeod (2009). Proposed Conditions of Certification **PAL-1** to **PAL-7** are designed to mitigate paleontological resource impacts, as discussed above, to less than significant levels (pursuant CEQA). These conditions essentially require that potential impacts to paleontological resource-bearing sediments be mitigated through worker training and monitoring by qualified paleontologists per Conditions of Certification **PAL-1** through **PAL-7**.

The proposed conditions of certification allow the BLM Authorized Office and the Energy Commission’s CPM and the applicant to adopt a compliance monitoring scheme ensuring compliance with LORS applicable to geological hazards and the protection of geological, mineralogical, and paleontological resources.

D.2.4.2.2 Construction Impacts and Mitigation

The design-level geotechnical investigation, required for the project by the CBC (2007) and proposed Condition of Certification **GEO-1** should provide standard engineering design recommendations for mitigation of earthquake ground shaking, potential hydrocompaction, and corrosive soils.

As noted above, no viable geological or mineralogical resources are known to exist in the vicinity of the proposed RSPP construction site. However the Quaternary older alluvium which underlies the proposed project site is considered to have moderate to high paleontological sensitivity with the degree of sensitivity increasing with the depth of excavation. Construction of the proposed project will include grading, foundation excavation, and utility trenching. Based on the soils profile, SVP assessment criteria, and the shallow depth of the potentially fossiliferous geological units, staff considers the probability of encountering paleontological resources to be high.

Proposed Conditions of Certification **PAL-1** to **PAL-7** are designed to mitigate any paleontological resource impacts, as discussed above, to a less than significant level (pursuant CEQA). Essentially, Conditions of Certification **PAL-1** to **PAL-7** require a worker education program in conjunction with monitoring of earthwork activities by qualified professional paleontologists (PRS). Earthwork is halted any time potential

fossils are recognized by either the paleontologist or the worker. When properly implemented, the conditions of certification yield a net gain to the science of paleontology since fossils that would not otherwise have been discovered can be collected, identified, studied, and properly curated. A paleontological resource specialist is retained, for the project by the applicant, to produce a monitoring and mitigation plan, conduct the worker training, and provide the monitoring. During the monitoring, the PRS can and often does petition the Energy Commission for a change in the monitoring protocol. Most commonly, this is a request for lesser monitoring after sufficient monitoring has been performed to ascertain that there is little chance of finding significant fossils. In other cases, the PRS can propose increased monitoring due to unexpected fossil discoveries or in response to repeated out-of-compliance incidents by the earthwork contractor.

Based upon the literature and archives search, field surveys, and compliance documentation for the proposed RSPP project, the applicant has proposed monitoring and mitigation measures to be followed during the construction of the project. Energy Commission staff believes that the facility can be designed and constructed to minimize the effect of geological hazards and impacts to potential paleontological resources at the site during project design life.

D.2.4.2.3 Operation Impacts and Mitigation

Operation of the proposed new solar energy generating facility should not have any adverse impact on geological, mineralogical, or paleontological resources.

D.2.4.2.4 Project Closure and Decommissioning

The future decommissioning and closure of the project should not negatively affect geological, mineralogical, or paleontological resources since the ground disturbed during plant decommissioning and closure would have been already disturbed, and mitigated as required, during construction and operation of the project.

D.2.4.3 CEQA LEVEL OF SIGNIFICANCE

California Environmental Quality Act guidelines strive to assure projects on public lands will not:

- Block access to a geological or mineralogical resource, a source of industrial minerals, or construction aggregates.
- Damage, destroy or block access to a natural geological feature with aesthetic and/or scientific value.
- Damage, destroy, or block access to a significant paleontological resource (primarily but not always, vertebrate fossils).
- Increase or initiate regional ground subsidence through extraction of ground water, petroleum, or natural gas.
- Construct structures that would be dangerous to workers or the general public as the result of natural geological hazards of the site.

Independent research conducted by CEC staff geologists verifies that there are no known geological or mineralogical resources or unusual geological features near or within the boundary of the proposed RSPP site. The CEQA level of significance from these areas of concern is “no impact.” Since major ground water withdrawal is not anticipated and regional subsidence is not a known geological hazard in this area, CEC staff concludes that ground water withdrawal for this project would result in an impact of “less than significant.”

All structures on this site must be constructed to the standards of the current CBC (2007), as specified in proposed Condition of Certification **GEN-1** under **FACILITY DESIGN**. The building code standards are based on both theoretical design and observation of component failures over many years. The intent of the building code is to minimize the risk to human life from natural hazards, including those inherent in the geological environment (earthquake-related, landslides, tsunamis/seiches, volcanic eruptions) and those from other sources, primarily high wind loading. Implementation of these design standards, per **GEN-1**, should result in geological hazards being “less than significant (pursuant CEQA) with mitigation” (mitigation being proper design for the site-specific hazards).

Energy Commission staff concludes that the RSPP site is situated in a geological environment with a high potential to encounter significant paleontological resources, particularly in deeper excavations required for the large structures. Potential impacts to paleontological resources, within the proposed project, can be mitigated to a (CEQA) less than significant level by adopting and enforcing the proposed Conditions of Certification **PAL-1** through **PAL-7**.

D.2.5 NORTHERN UNIT ALTERNATIVE

The Northern Unit Alternative would be a 146 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because (1) it eliminates about 42 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources (desert tortoise and Mohave ground squirrel), cultural resources, and recreational uses, and (2) avoids constructing a solar facility in the Mohave Ground Squirrel Conservation Area (MGSCA).

The Northern Unit Alternative would consist of 167 solar collector array loops with a net generating capacity of approximately 146 MW. The total disturbance area would be approximately 1,134 acres of land. This alternative would retain 58 percent of the proposed solar array loops and would affect 58 percent of the land of the proposed 250 MW project. The boundaries of the Northern Unit Alternative are shown in **Alternatives Figure 1**.

D.2.5.1 SETTING AND EXISTING CONDITIONS

This alternative is located entirely within the ROW boundaries of the proposed project. It eliminates about 42 percent of the proposed project area and reduces the net output to

146 MW. As a result, the environmental setting consists of the northern portion of the proposed project, as well as an unchanged area affected by the project linear components.

D.2.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The discussion of impacts to the proposed project, discussed in **Section D.2.4.2**, applies also to the Northern Unit Alternative. As with the proposed project, two types of impacts are considered. The first is geological hazards, which could impact the proper functioning of the proposed facility and create life/safety concerns. The second is the potential impacts the proposed facility could have on existing geological, mineralogical, and paleontological resources in the area.

Because the overall geological setting is the same as that of the proposed project, and the same types of facilities would be constructed in this alternative, the impacts would be the same as for the proposed project. The active geological setting means that the site could be subject to intense levels of earthquake-related ground shaking. The effects of strong ground shaking would need to be mitigated through structural designs required by the CBC (2007) and the project geotechnical report. The CBC (2007) requires that structures be designed to resist seismic stresses from ground acceleration. The project geotechnical investigation has identified no additional hazards on this site.

There are no known viable geological or mineralogical resources at the proposed RSPP site, so none exist in the Northern Unit Alternative. Because the alternative site overlies geological formations with high paleontological sensitivity (PFYC Condition 2, Class 4a, 4b), there is the potential for impacts to paleontological resources to occur, but these would be mitigated through worker training and monitoring by qualified paleontologists, as required by Conditions of Certification, **PAL-1** through **PAL-7**.

Overall, this alternative could be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards and in a manner that both protects environmental quality and assures public safety.

D.2.5.3 CEQA LEVEL OF SIGNIFICANCE

Like the proposed project, the potential is low for significant adverse impacts (pursuant CEQA) to Northern Unit Alternative from geological hazards during its design life and to potential geological, mineralogical, and paleontological resources from the construction, operation, and closure of the proposed project. It is CEC staff's conclusion that this alternative can be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards and in a manner that both protects environmental quality and assures public safety. The CEQA level of significance would remain unchanged from the proposed project.

D.2.6 SOUTHERN UNIT ALTERNATIVE

The Southern Unit Alternative would be a 104 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is

analyzed because it eliminates about 58 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources, and cultural resources.

The Southern Unit Alternative would consist of 119 solar array loops with a net generating capacity of approximately 104 MW. The total disturbance area would be approximately 908 acres of land. This alternative would retain 42 percent of the proposed solar array loops and would affect 42 percent of the land of the proposed 250 MW project.

The boundaries of the Southern Unit Alternative are shown in **Alternatives Figure 2**. This area would avoid a large portion of the El Paso Wash and sensitive biological resources, including areas that were mapped as occupied tortoise and Mohave ground squirrel habitat (live tortoise and/or active burrows and sign).

D.2.6.1 SETTING AND EXISTING CONDITIONS

This alternative is located entirely within the ROW boundaries of the proposed project. It eliminates about 58 percent of the proposed project area and reduces the net output to 104 MW. As a result, the environmental setting consists of the southern portion of the proposed project, as well as the unchanged area affected by the project linear components.

D.2.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The discussion of impacts to the proposed project, discussed in **Section D.2.4.2**, applies also to the Southern Unit Alternative. As with the proposed project, two types of impacts are considered. The first is geological hazards, which could impact the proper functioning of the proposed facility and create life/safety concerns. The second is the potential impacts the proposed facility could have on existing geological, mineralogical, and paleontological resources in the area.

Because the overall geological setting is the same as that of the proposed project, and the same types of facilities would be constructed in this alternative, the impacts would be the same as for the proposed project. The active geological setting means that the site could be subject to intense levels of earthquake-related ground shaking. The effects of strong ground shaking would need to be mitigated through structural design required by the CBC (2007) and the project geotechnical report. The CBC (2007) requires that structures be designed to resist seismic stresses from ground acceleration. The project geotechnical investigation has identified no additional hazards on this site.

There are no known viable geological or mineralogical resources at the proposed RSPP site, so none exist on the Southern Unit Alternative. Because the alternative is also located in geological formations with moderate to high paleontological sensitivity (PFYC Condition 2, Class 4a, 4b), there is the potential for impacts to paleontological resources to occur, but these would be mitigated through worker training and monitoring by qualified paleontologists, as required by Conditions of Certification, **PAL-1** through **PAL-7**.

Overall, this alternative could be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards and in a manner that both protects environmental quality and assures public safety.

D.2.6.3 CEQA LEVEL OF SIGNIFICANCE

Like the proposed project, the potential is low for significant adverse impacts (pursuant CEQA) to Southern Unit Alternative from geological hazards during its design life and to potential geological, mineralogical, and paleontological resources from the construction, operation, and closure of the proposed project. It is staff's conclusion that this alternative can be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards and in a manner that both protects environmental quality and assures public safety. The CEQA level of significance would remain unchanged from the proposed project.

D.2.7 ORIGINAL PROPOSED PROJECT ALTERNATIVE

The Original Proposed Project Alternative would be a 250 MW solar facility as originally proposed by Solar Millennium. This alternative is analyzed because it would reduce the amount of land developed within the Mojave Ground Squirrel Conservation Area and it could transmit the full 250 MW of power that Solar Millennium has requested.

The Original Proposed Project Alternative would consist of 278 solar array loops with a net generating capacity of approximately 250 MW. The total disturbance area would be approximately 1,794 acres of land. A shorter transmission interconnection – 1,250 feet as compared to the proposed project interconnection of 3,900 feet – would be needed.

The boundaries of the Original Proposed Project Alternative are shown in **Alternatives Figure 3**. This project footprint contains two desert ephemeral washes that would require redirection and smaller dry desert washes also traverse the site. In addition this site is the location of prime desert tortoise and Mojave ground squirrel habitat.

D.2.7.1 SETTING AND EXISTING CONDITIONS

This alternative extends slightly north of the boundaries of the proposed project but still lies within the same geologic units. From the standpoint of geological hazards, geological, mineralogical, and paleontological resources, the environmental setting of the originally proposed project is unchanged from the proposed project. Although a shorter (by 2,650 feet) transmission interconnection would be required, this benefit would be, at least partially, offset by the need to relocate two existing SCE transmission lines.

D.2.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The discussion of impacts to the proposed project, discussed in **Section D.2.4.2**, applies also to the Original Proposed Project Alternative. As with the proposed project, two types of impacts are considered. The first is geological hazards, which could impact the proper functioning of the proposed facility and create life/safety concerns. The second is the potential impacts the proposed facility could have on existing geological, mineralogical, and paleontological resources in the area.

D.2.7.3 CEQA LEVEL OF SIGNIFICANCE

Like the proposed project, the potential is low for significant adverse impacts (pursuant CEQA) to the Original Proposed Project Alternative from geological hazards during its design life and moderate to high paleontological resources from the construction, operation, and closure of the proposed project. It is staff's conclusion that this alternative can be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards and in a manner that both protects environmental quality and assures public safety. The CEQA level of significance would remain unchanged from the proposed project.

D.2.8 NO PROJECT/NO ACTION ALTERNATIVES

D.2.8.1 1: NO ACTION ON RIDGECREST SOLAR POWER PROJECT APPLICATION AND ON CDCA LAND USE PLAN AMENDMENT

Under this alternative, the proposed RSPP would not be approved by the Energy Commission and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site and no ground disturbance. As a result, impacts caused by the effects of earthquake related ground shaking would not occur. Because no ground disturbance would occur, impacts to potential geological, mineralogical, and paleontological resources from the construction, operation, and closure of the proposed project would not occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations

D.2.8.2 2: NO ACTION ON RIDGECREST SOLAR POWER PROJECT AND AMEND THE CDCA LAND USE PLAN TO MAKE THE AREA AVAILABLE FOR FUTURE SOLAR DEVELOPMENT

Under this alternative, the proposed RSPP would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site will be developed with another solar technology. Construction and operation requirements for solar technologies vary; however, it is expected that all solar technologies require some grading and some infrastructure. The effects of strong ground shaking on the project structures would need to be mitigated, to the extent practical, through structural designs

required by the CBC as with the proposed project. Because it is expected that all solar technologies would require ground disturbance, the impacts to potential geological, mineralogical, and paleontological resources from the construction, operation, and closure of the alternative would likely be similar to under the proposed project.

D.2.8.3 3: NO ACTION ON RIDGECREST SOLAR POWER PROJECT APPLICATION AND AMEND THE CDCA LAND USE PLAN TO MAKE THE AREA UNAVAILABLE FOR FUTURE SOLAR DEVELOPMENT

Under this alternative, the proposed RSPP would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended so no solar projects can be approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no construction of a solar facility. Therefore, this No Project/No Action Alternative would not impact potential geological, mineralogical, and paleontological resources from the construction, operation, and closure of the proposed project. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

D.2.9 COMPARISON OF ALTERNATIVES AND PROPOSED PROJECT

**Geology and Paleontology Table 3
Comparison of Proposed Project and Alternatives**

Impact	Proposed Project (250 MW)	Northern Unit (146 MW)	Southern Unit (104 MW)	Original Proposed Project (250 MW)	No Project/No Action*
No. of Acres	1,760	1,134	908	1,794	0
Geological Hazards	Ground Shaking, Hydrocompaction, Corrosive Soils – Less than significant with mitigation	Ground Shaking, Hydrocompaction, Corrosive Soils – Less than significant with mitigation	Ground Shaking, Hydrocompaction, Corrosive Soils – Less than significant with mitigation	Ground Shaking, Hydrocompaction, Corrosive Soils – Less than significant with mitigation	Not Applicable (N/A)
Geological Resources	None identified – No impact	None identified – No impact	None identified – No impact	None identified – No impact	N/A
Mineralogical Resources	None identified – No impact	None identified – No impact	None identified – No impact	None identified – No impact	N/A
Paleontological Resources	High sensitivity – No impact with mitigation	High sensitivity – No impact with mitigation	High sensitivity – No impact with mitigation	High sensitivity – No impact with mitigation	N/A

*All No Project/No Action alternatives assume that the RSPP would not be built on the proposed site.

D.2.10 CUMULATIVE IMPACTS

Section B.3, Cumulative Scenario, provides detailed information on the potential cumulative solar and other development projects in the project area. Together, these projects comprise the cumulative scenario which forms the basis of the cumulative impact analysis for the proposed project. In summary, these projects are:

- Renewable energy projects on BLM, State, and private lands, as shown on **Cumulative Figures 1 and 2** and in **Cumulative Tables 1A and 1B**. Although not all of those projects are expected to complete the environmental review processes, or be funded and constructed, the list is indicative of the large number of renewable projects currently proposed in California.
- Foreseeable future projects in the immediate project area, as shown on **Cumulative Impacts Figure 3, Existing and Future/Foreseeable Projects in the Ridgecrest Area, and Cumulative Tables 2 and 3**. **Table 2** presents existing projects in this area and **Table 3** presents future foreseeable projects in the project. Both tables indicate project name and project type, its location and its status.

These projects are defined within a geographic area that has been identified by the CEC and BLM as covering an area large enough to provide a reasonable basis for evaluating cumulative impacts for all resource elements or environmental parameters. Most of these projects have, are, or will be required to undergo their own independent environmental review under CEQA and/or NEPA. Even if the cumulative projects described in **Section B.3** have not yet completed the required environmental processes, they were considered in the cumulative impacts analyses in this SA/Draft EIS.

D.2.10.1 GEOGRAPHIC SCOPE OF ANALYSIS

The geographic area considered for cumulative impacts on geology and paleontology is the entire Indian Wells Valley in the southwestern corner of the Basin and Range geomorphic province. The potential impacts are limited to those involving paleontological resources since no geological or mineralogical resources have been identified within the boundaries of the proposed project. There are no geological hazards with potential cumulative effects, other than regional subsidence from ground water withdrawal. No ground water withdrawal is required for the proposed project or any of its alternatives.

D.2.10.2 EFFECTS OF PAST AND PRESENT PROJECTS

Any previously completed project involving subsurface excavation without paleontological monitoring might already have had a detrimental effect on paleontological resources in the area defined above under **GEOGRAPHIC SCOPE OF ANALYSIS**. Given the general scarcity of fossils, even within known fossil bearing strata, the possibility of prior damage is real but modest, unknown, and unavoidable, after the fact.

D.2.10.3 EFFECTS OF REASONABLY FORESEEABLE FUTURE PROJECTS

D.2.10.3.1 Foreseeable Projects in the Project Area

Many future foreseeable projects identified in **Cumulative Tables 2 and 3 (Section B.3)** are located within the Indian Wells Valley. Such projects could include ground disturbance to sufficient depth to encounter potential fossil-bearing strata. All projects on BLM land would be subject to paleontological monitoring and mitigation during construction. When properly implemented and enforced, these safeguards would provide adequate protection of paleontological resources, reducing potential impacts to a (CEQA) less than significant level.

D.2.10.3.2 Foreseeable Renewable Projects in the California Desert

As shown in **Section B.3, Cumulative Scenario Table 1A**, the Ridgecrest field office of the BLM is aware of 5 solar energy and 16 wind energy potential projects totaling 155,842 acres of land under their jurisdiction. All energy projects on BLM land would be subject to paleontological monitoring and mitigation during construction. When properly implemented and enforced, these safeguards would provide adequate protection of paleontological resources, reducing potential impacts to a (CEQA) less than significant level.

In addition to potential renewable energy projects on BLM land, a large number of renewable energy projects are proposed for the Basin and Range, Mojave and Colorado Desert regions of Southern California on State and private lands. These projects are summarized in **Table 1B** and **Table 3** of **Section B.3, Cumulative Scenario**. Of all the possible renewable energy projects within the geographic scope of this analysis, the following, by virtue of size and location, have the greatest potential to affect paleontological resources:

- First Solar Power Project (7,183 acres)
- Brewer Energy Wind Project (3,200 acres)
- Renew Energy Wind Project (14,209 acres)

These projects would be subject to CEC and/or NEPA/CEQA environmental review which would include requirements for construction monitoring and mitigation of potential paleontological resources. When properly implemented and enforced, these safeguards should provide adequate protection of paleontological resources, reducing potential impacts to a (CEQA) less than significant level.

D.2.10.3.3 Contribution of the Ridgecrest Solar Power Project to Cumulative Impacts

Construction

Construction of the project would require localized excavation over a very large area. Because the project area lies predominantly within geological units with high paleontological sensitivity, the required excavation could, potentially, damage paleontological resources. Any damage could be cumulative to damage from other

projects within the same geological formations. Implementation and enforcement of a properly designed Paleontological Resource Monitoring and Mitigation Plan (PRMMP) at this RSPP site should result in a net gain to the science of paleontology by allowing fossils that would not otherwise have been found, to be recovered, identified, studied, and preserved. Cumulative impacts from RSPP, in consideration with other nearby similar projects, should therefore be either neutral (no fossils encountered) or positive (fossils encountered, preserved, and identified).

Operation

The operation of the RSPP Project would not present additional risk to geological resources (none identified) or paleontological resources. Once ground disturbing activity is complete plant operation has no real potential to further affect paleontological resources. Therefore, routine plant operation would not increase potential cumulative affects on paleontological resources. The longer the plant operates, however, the more likely it is to be damaged by geological hazards, primarily earthquake-related ground shaking. Construction and operation of the plant does not increase the potential of geological hazards at the site, just their potential to damage civil improvements.

Decommissioning

The decommissioning of the Ridgecrest Solar Project is expected to result in no adverse impacts related to geology or paleontology. Any potential impact to geological resources (none identified) or paleontological resources would have occurred and been mitigated during the ground disturbing phase of project construction.

D.2.10.4 OVERALL CONCLUSION

Paleontological resources have been documented in the general area of the project. As the value of paleontological resources is associated with their discovery within a specific geological host unit, the potential impacts to paleontological resources due to construction activities will be mitigated as required by proposed Conditions of Certification **PAL-1** through **PAL-7**. Implementation of these conditions should result in a net gain to the science of paleontology by allowing fossils that would not otherwise have been found to be recovered, identified, studied, and preserved. Cumulative impacts, in consideration with other nearby similar projects, should be either neutral (no fossils encountered) or positive (fossils encountered, preserved, and identified).

Based on the above discussion, staff believes that the potential for significant adverse cumulative impacts (pursuant CEQA) to the proposed project from geological hazards during the project's design life is negligible and that the potential for impacts to geological, mineralogical, and paleontological resources is low.

The proposed conditions of certification allow the BLM Authorized Office and the Energy Commission CPM and the applicant to adopt a compliance monitoring scheme ensuring compliance with applicable LORS for geological hazards and geological, mineralogical, and paleontological resources.

D.2.11 COMPLIANCE WITH LORS

Federal, state, or local/county LORS applicable to this project or alternatives other than the No Action alternative, were detailed in **Geology and Paleontology Table 1**. Staff anticipates that the project will comply with applicable LORS.

D.2.12 NOTEWORTHY PUBLIC BENEFITS

The science of paleontology is advanced by the discovery, study and curation of new fossils. These fossils can be significant if they represent a new species, verify a known species in a new location and/or if they include structures of similar specimens that had not previously been found preserved. In general, most fossil discoveries are the result of excavations, either purposeful in known or suspected fossil localities or as the result of excavations made during earthwork for civil improvements or mineral extraction. Proper monitoring of excavations at the proposed RSPP facility, in accordance with an approved Paleontological Monitoring and Mitigation Plan, could result in fossil discoveries which would enhance our understanding of the prehistoric climate, geology, and geographic setting of the region for the benefit of current and future generations.

D.2.13 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

The proposed RSPP is situated in an active geologic environment. Strong ground shaking potential must be mitigated through foundation and structural design as required by the CBC (2007). The potential for hydrocompaction, as well as impacts caused by corrosive soils, must be evaluated and mitigated, as appropriate, in accordance with a design-level geotechnical investigation as required by the CBC (2007), proposed Condition of Certification **GEO-1**, and proposed Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** under **FACILITY DESIGN**. Paleontological resources have been documented in the general area of the project and in materials similar to those that are present at the site. The potential impacts to paleontological resources due to construction activities will be mitigated as required by proposed Conditions of Certification **PAL-1** to **PAL-7**.

The proposed conditions of certification allow BLM's Authorized Officer, the Energy Commission CPM, and the applicant to adopt a compliance monitoring scheme ensuring compliance with applicable LORS for geologic hazards and geologic, mineralogic, and paleontological resources.

GEO-1 The Soils Engineering Report required by Section 1802A of the 2007 CBC should specifically include laboratory test data, associated geotechnical engineering analyses, and a thorough discussion of the site soils' potential for hydrocompaction and the presence of corrosive soils. The report should also include recommendations necessary to mitigate these potential geologic hazards.

Verification: The project owner shall include in the application for a grading permit a copy of the Soils Engineering Report which addresses the presence of soils prone to

hydrocompaction and corrosive soils, and a summary of how the results of the analyses were incorporated into the project foundation and grading plan design for review and comment by the Chief Building Official (CBO). A copy of the Soils Engineering Report, application for grading permit and any comments by the CBO are to be provided to BLM's Authorized Officer and the CPM at least 30 days prior to grading.

PAL-1 The project owner shall provide BLM's Authorized Officer and the CPM with the resume and qualifications of its PRS for review and approval. If the approved PRS is replaced prior to completion of project mitigation and submittal of the Paleontological Resources Report, the project owner shall obtain BLM's Authorized Officer and CPM approval of the replacement PRS. The project owner shall keep resumes on file for qualified PRMs. If a PRM is replaced, the resume of the replacement PRM shall also be provided to BLM's Authorized Officer and the CPM.

The PRS resume shall include the names and phone numbers of references. The resume shall also demonstrate to the satisfaction of BLM's Authorized Officer and the CPM the appropriate education and experience to accomplish the required paleontological resource tasks.

As determined by BLM's Authorized Officer and the CPM, the PRS shall meet the minimum qualifications for a vertebrate paleontologist as described in the SVP guidelines of 1995. The experience of the PRS shall include the following:

1. Institutional affiliations, appropriate credentials, and college degree;
2. Ability to recognize and collect fossils in the field;
3. Local geological and biostratigraphic expertise;
4. Proficiency in identifying vertebrate and invertebrate fossils; and
5. At least three years of paleontological resource mitigation and field experience in California and at least one year of experience leading paleontological resource mitigation and field activities.

The project owner shall ensure that the PRS obtains qualified paleontological resource monitors to monitor as he or she deems necessary on the project. PRMs shall have the equivalent of the following qualifications:

- BS or BA degree in geology or paleontology and one year of experience monitoring in California; or
- AS or AA in geology, paleontology, or biology and four years' experience monitoring in California; or
- Enrollment in upper division classes pursuing a degree in the fields of geology or paleontology and two years of monitoring experience in California.

Verification:

(1) At least 60 days prior to the start of ground disturbance, the project owner shall submit a resume and statement of availability of its designated PRS for on-site work.

(2) At least 20 days prior to ground disturbance, the PRS or project owner shall provide a letter with resumes naming anticipated monitors for the project, stating that the identified monitors meet the minimum qualifications for paleontological resource monitoring required by the condition. If additional monitors are obtained during the project, the PRS shall provide additional letters and resumes to BLM's Authorized Officer and the CPM. The letter shall be provided to BLM's Authorized Officer and the CPM no later than one week prior to the monitor's beginning on-site duties.

(3) Prior to the termination or release of a PRS, the project owner shall submit the resume of the proposed new PRS to BLM's Authorized Officer and the CPM for review and approval.

PAL-2 The project owner shall provide to the PRS, BLM's Authorized Officer and the CPM, for approval, maps and drawings showing the footprint of the power plants, construction lay down areas, and all related facilities. Maps shall identify all areas of the project where ground disturbance is anticipated. If the PRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the PRS, BLM's Authorized Officer and CPM. The site grading plan and plan and profile drawings for the utility lines would be acceptable for this purpose. The plan drawings should show the location, depth, and extent of all ground disturbances and be at a scale of 1 inch = 40 feet to 1 inch = 100 feet range. If the footprint of the project or its linear facilities change, the project owner shall provide maps and drawings reflecting those changes to the PRS, BLM's Authorized Officer and CPM.

If construction of the RSPP project proceeds in phases, maps and drawings may be submitted prior to the start of each power plant. A letter identifying the proposed schedule of each project power plant shall be provided to the PRS, BLM's Authorized Officer and CPM. Before work commences on affected power plants, the project owner shall notify the PRS, BLM's Authorized Officer and CPM of any construction phase scheduling changes.

At a minimum, the project owner shall ensure that the PRS or PRM consults weekly with the project superintendent or construction field manager to confirm area(s) to be worked the following week, and until ground disturbance is completed.

Verification:

(1) At least 30 days prior to the start of ground disturbance, the project owner shall provide the maps and drawings to the PRS, BLM's Authorized Officer and CPM.

(2) If there are changes to the footprint of the project, revised maps and drawings shall be provided to the PRS, BLM's Authorized Officer and CPM at least 15 days prior to the start of ground disturbance.

(3) If there are changes to the scheduling of the construction phases of each power plant, the project owner shall submit a letter to BLM's Authorized Officer and the CPM within 5 days of identifying the changes.

PAL-3 If after review of the plans provided pursuant to **PAL-2**, the PRS determines that materials with moderate, high, or unknown paleontological sensitivity could be impacted, the project owner shall ensure that the PRS prepares, and the project owner submits to BLM's Authorized Officer and the CPM for review and approval, a paleontological resources monitoring and mitigation plan (PRMMP) to identify general and specific measures to minimize potential impacts to significant paleontological resources. Approval of the PRMMP by BLM's Authorized Officer and the CPM shall occur prior to any ground disturbance. The PRMMP shall function as the formal guide for monitoring, collecting, and sampling activities, and may be modified with BLM's Authorized Officer and CPM approval. This document shall be used as the basis of discussion when on-site decisions or changes are proposed. Copies of the PRMMP shall reside with the PRS, each monitor, the project owner's on-site manager, BLM's Authorized Officer and the CPM.

The PRMMP shall be developed in accordance with the guidelines of the SVP (1995) and shall include, but not be limited, to the following:

1. Assurance that the performance and sequence of project-related tasks, such as any literature searches, pre-construction surveys, worker environmental training, fieldwork, flagging or staking, construction monitoring, mapping and data recovery, fossil preparation and collection, identification and inventory, preparation of final reports, and transmittal of materials for curation will be performed according to PRMMP procedures;
2. Identification of the person(s) expected to assist with each of the tasks identified within the PRMMP and the conditions of certification;
3. A thorough discussion of the anticipated geological units expected to be encountered, the location and depth of the units relative to the project when known, and the known sensitivity of those units based on the occurrence of fossils either in that unit or in correlative units;
4. An explanation of why, how, and how much sampling is expected to take place and in what units. Include descriptions of different sampling procedures that shall be used for fine-grained and coarse-grained units;
5. A discussion of the locations of where the monitoring of project construction activities is deemed necessary, and a proposed plan for monitoring and sampling;
6. A discussion of procedures to be followed in the event of a significant fossil discovery, halting construction, resuming construction, and how notifications will be performed;

7. A discussion of equipment and supplies necessary for collection of fossil materials and any specialized equipment needed to prepare, remove, load, transport, and analyze large-sized fossils or extensive fossil deposits;
8. Procedures for inventory, preparation, and delivery for curation into a retrievable storage collection in a public repository or museum, which meets the Department of the Interior 411 Departmental Manual (DM) provisions for museum property, including capability for providing adequate long-term curatorial services, such as a physically secure environment, and maintaining professional staff qualified to catalog, care for, preserve, retrieve, and loan, where appropriate, these materials and associated records;
9. Identification of the institution that has agreed to receive data and fossil materials collected, requirements or specifications for materials delivered for curation, and how they will be met, and the name and phone number of the contact person at the institution; and
10. A copy of the paleontological conditions of certification.

Verification: At least 30 days prior to ground disturbance, the project owner shall provide a copy of the PRMMP to BLM's Authorized Officer and the CPM. The PRMMP shall include an affidavit of authorship by the PRS, and acceptance of the PRMMP by the project owner evidenced by a signature.

PAL-4 If after review of the plans provided pursuant to **PAL-2**, the PRS determines that materials with moderate, high, or unknown paleontological sensitivity could be impacted then, prior to ground disturbance and for the duration of construction activities involving ground disturbance, the project owner and the PRS shall prepare and conduct weekly BLM Authorized Officer- and CPM-approved training for the following workers: project managers, construction supervisors, foremen and general workers involved with or who operate ground-disturbing equipment or tools. Workers shall not excavate in sensitive units prior to receiving BLM Authorized Officer- and CPM-approved worker training. Worker training shall consist of an initial in-person PRS training during the project kick-off, for those mentioned above. Following initial training, a CPM-approved video or in-person training may be used for new employees. The training program may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or other areas of interest or concern. No ground disturbance shall occur prior to BLM's Authorized Officer and CPM approval of the Worker Environmental Awareness Program (WEAP), unless specifically approved by the CPM.

The WEAP shall address the possibility of encountering paleontological resources in the field, the sensitivity and importance of these resources, and legal obligations to preserve and protect those resources.

The training shall include:

1. A discussion of applicable laws and penalties under the law;
2. Good quality photographs or physical examples of vertebrate fossils for project sites containing units of high paleontological sensitivity;
3. Information that the PRS or PRM has the authority to halt or redirect construction in the event of a discovery or unanticipated impact to a paleontological resource;
4. Instruction that employees are to halt or redirect work in the vicinity of a find and to contact their supervisor and the PRS or PRM;
5. An informational brochure that identifies reporting procedures in the event of a discovery;
6. A WEAP certification of completion form signed by each worker indicating that he/she has received the training; and
7. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

Verification:

(1) At least 30 days prior to ground disturbance, the project owner shall submit the proposed WEAP, including the brochure, with the set of reporting procedures for workers to follow.

(2) At least 30 days prior to ground disturbance, the project owner shall submit the script and final video to BLM's Authorized Officer and the CPM for approval if the project owner is planning to use a video for interim training.

(3) If the owner requests an alternate paleontological trainer, the resume and qualifications of the trainer shall be submitted to BLM's Authorized Officer and the CPM for review and approval prior to installation of an alternate trainer. Alternate trainers shall not conduct training prior to BLM's Authorized Officer and CPM authorization.

(4) In the monthly compliance report (MCR, the project owner shall provide copies of the WEAP certification of completion forms with the names of those trained and the trainer or type of training (in-person or video) offered that month. The MCR shall also include a running total of all persons who have completed the training to date.

PAL-5 The project owner shall ensure that the PRS and PRM(s) monitor consistent with the PRMMP all construction-related grading, excavation, trenching, and augering in areas where potential fossil-bearing materials have been identified, both at the site and along any constructed linear facilities associated with the project. In the event that the PRS determines full-time monitoring is not necessary in locations that were identified as potentially fossil-bearing in the PRMMP, the project owner shall notify and seek the concurrence of BLM's Authorized Officer and the CPM.

The project owner shall ensure that the PRS and PRM(s) have the authority to halt or redirect construction if paleontological resources are encountered. The project owner shall ensure that there is no interference with monitoring activities unless directed by the PRS. Monitoring activities shall be conducted as follows:

1. Any change of monitoring from the accepted schedule in the PRMMP shall be proposed in a letter or email from the PRS and the project owner to BLM's Authorized Officer and the CPM prior to the change in monitoring and will be included in the monthly compliance report. The letter or email shall include the justification for the change in monitoring and be submitted to BLM's Authorized Officer and the CPM for review and approval.
2. The project owner shall ensure that the PRM(s) keep a daily monitoring log of paleontological resource activities. The PRS may informally discuss paleontological resource monitoring and mitigation activities with BLM's Authorized Officer and the CPM at any time.
3. The project owner shall ensure that the PRS notifies BLM's Authorized Officer and the CPM within 24 hours of the occurrence of any incidents of non-compliance with any paleontological resources conditions of certification. The PRS shall recommend corrective action to resolve the issues or achieve compliance with the conditions of certification.
4. For any significant paleontological resources encountered, either the project owner or the PRS shall notify BLM's Authorized Officer and the CPM within 24 hours, or Monday morning in the case of a weekend event where construction has been halted because of a paleontological find.

The project owner shall ensure that the PRS prepares a summary of monitoring and other paleontological activities placed in the monthly compliance reports. The summary will include the name(s) of PRS or PRM(s) active during the month, general descriptions of training and monitored construction activities, and general locations of excavations, grading, and other activities. A section of the report shall include the geological units or subunits encountered, descriptions of samplings within each unit, and a list of identified fossils. A final section of the report will address any issues or concerns about the project relating to paleontological resource monitoring, including any incidents of non-compliance or any changes to the monitoring plan that have been approved by BLM's Authorized Officer and the CPM. If no monitoring took place during the month, the report shall include an explanation in the summary as to why monitoring was not conducted.

Verification: The project owner shall ensure that the PRS submits the summary of monitoring and paleontological activities in the MCR. When feasible, BLM's Authorized Officer and the CPM shall be notified 10 days in advance of any proposed changes in monitoring different from the plan identified in the PRMMP. If there is any unforeseen change in monitoring, the notice shall be given as soon as possible prior to implementation of the change.

PAL-6 The project owner, through the designated PRS, shall ensure that all components of the PRMMP are adequately performed including collection of fossil materials, preparation of fossil materials for analysis, analysis of fossils, identification and inventory of fossils, the preparation of fossils for curation, and the delivery for curation of all significant paleontological resource materials encountered and collected during project construction.

Verification: The project owner shall maintain in his/her compliance file copies of signed contracts or agreements with the designated PRS and other qualified research specialists. The project owner shall maintain these files for a period of three years after project completion and approval of BLM Authorized Officer- and CPM-approved paleontological resource report (see **PAL-7**). The project owner shall be responsible for paying any curation fees charged by the museum for fossils collected and curated as a result of paleontological mitigation. A copy of the letter of transmittal submitting the fossils to the curating institution shall be provided to BLM's Authorized Officer and the CPM.

PAL-7 The project owner shall ensure preparation of a Paleontological Resources Report (PRR) by the designated PRS. The PRR shall be prepared following completion of the ground-disturbing activities. The PRR shall include an analysis of the collected fossil materials and related information, and submit it to the CPM for review and approval.

The report shall include, but is not limited to, a description and inventory of recovered fossil materials; a map showing the location of paleontological resources encountered; determinations of sensitivity and significance; and a statement by the PRS that project impacts to paleontological resources have been mitigated below the level of significance.

Verification: Within 90 days after completion of ground-disturbing activities, including landscaping, the project owner shall submit the PRR under confidential cover to BLM's Authorized Officer and the CPM.

D.2.14 CONCLUSIONS

The applicant should easily be able to comply with applicable LORS, provided that the proposed conditions of certification are implemented and followed. The design and construction of the project should have no adverse impact with respect to geological, mineralogical, and paleontological resources. Staff proposes to ensure compliance with applicable LORS through the adoption of the proposed conditions of certification listed below.

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D.3 POWER PLANT EFFICIENCY

Testimony of Shahab Khoshmashrab

D.3.1 SUMMARY OF CONCLUSIONS

The Ridgecrest Solar Power Project, if constructed and operated as proposed, would use solar energy to generate most of its capacity. Fossil fuel, in the form of propane, would be used only to reduce startup time and to keep the temperature of the heat transfer fluid above its relatively high freezing point. Compared to the project's expected overall production rate of approximately 500,000 MW hours (MWh), and compared to a typical fossil fuel-fired power plant of equal capacity, the amount of the annual power production from fossil fuel is insignificant.

The project would decrease reliance on fossil fuel, and would increase reliance on renewable energy resources. It would not create significant adverse effects on fossil fuel energy supplies or resources, would not require additional sources of energy supply, and would not consume fossil fuel energy in a wasteful or inefficient manner. No efficiency standards apply to this project. Staff therefore concludes that this project would present no significant adverse impacts on fossil fuel energy resources.

The Ridgecrest Solar Power Project, if constructed and operated as proposed, would occupy approximately six acres per MW of power output, a figure slightly lower than that of some other solar power technologies.

D.3.2 INTRODUCTION

The Ridgecrest Solar Power Project (Ridgecrest Solar), if constructed and operated as proposed, would generate 250 megawatts (MW) (nominal net output) of electricity. Ridgecrest Solar would be a solar thermal power plant in Kern County, California. The project would use the concentrated parabolic trough solar thermal technology to produce electrical power using steam turbine generators fed from solar steam generators. The land that would be occupied by this project for power generation and power plant operation would be approximately 1,440-acre site. Fossil fuel, in the form of propane, would be used to reduce startup time and to keep the temperature of the heat transfer fluid above its relatively high freezing point.

D.3.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

FOSSIL FUEL USE EFFICIENCY

One of the responsibilities of the California Energy Commission (Energy Commission) is to make findings on whether the energy use by a power plant, including the proposed Ridgecrest Solar project, would result in significant adverse impacts on the environment, as defined in the California Environmental Quality Act (CEQA). If the Energy Commission finds that Ridgecrest Solar's energy consumption creates a

significant adverse impact, it must further determine if feasible mitigation measures could eliminate or minimize that impact. In this analysis, staff addresses the inefficient and unnecessary consumption of energy.

In order to develop the Energy Commission's findings, this analysis will:

- Examine whether the facility would likely present any adverse impacts upon energy resources;
- Examine whether these adverse impacts are significant; and if so,
- Examine whether feasible mitigation measures or alternatives could eliminate those adverse impacts or reduce them to a level of insignificance.

SOLAR LAND USE EFFICIENCY

Solar thermal power plants typically consume much less fossil fuel (usually in the form of natural gas) than other types of thermal power plants. Therefore, common measures of power plant efficiency such as those described above are less meaningful. Solar power plants do occupy vast tracts of land, so, the focus for these types of facilities shifts from fuel efficiency to land use efficiency. To analyze the land use efficiency of a solar facility staff utilizes the following approach.

Solar thermal power plants convert the sun's energy into electricity in three basic steps:

- Mirrors and/or collectors capture the sun's rays.
- This solar energy is converted into heat.
- This heat is converted into electricity, typically in a heat engine such as a steam turbine generator or a Stirling Engine-powered generator.

The effectiveness of each of these steps depends on the specific technology employed; the product of these three steps determines the power plant's overall solar efficiency. The greater the project's solar efficiency, the less land the plant must occupy to produce a given power output.

The most significant environmental impacts caused by solar power plants result from occupying large expanses of land. The extent of these impacts is likely in direct proportion to the number of acres affected. For this reason, staff will evaluate the land use efficiency of proposed solar power plant projects. This efficiency will be expressed in terms of power produced, or MW per acre, and in terms of energy produced, or MW-hours per acre-year. Specifically:

- Power-based solar land use efficiency is calculated by dividing the maximum net power output in MW by the total number of acres impacted by the power plant, including roads and electrical switchyards and substations.
- Energy-based solar land use efficiency is calculated by dividing the annual net electrical energy production in MW-hours per year by the total number of acres impacted by the power plant. Since different solar technologies consume differing quantities of natural gas for morning warm-up, cloudy weather output leveling and heat transfer fluid freeze protection (and some consume no gas at all), this effect is accounted for. Specifically, gas consumption is backed out by reducing the plant's

net energy output by the amount of energy that could have been produced by consuming the project's annual gas consumption in a modern combined cycle power plant. (See **EFFICIENCY APPENDIX A**, immediately following.) This reduced energy output is then be divided by acres impacted.

D.3.4 PROPOSED PROJECT

D.3.4.1 SETTING AND EXISTING CONDITIONS

The applicant proposes to build and operate Ridgecrest Solar, a solar thermal power plant producing a total of 250 MW (nominal net output) and employing the concentrated parabolic trough solar thermal technology. The project would consist of one unit comprised of arrays of parabolic mirrors, solar steam generator heat exchangers, one steam turbine generator, and an air cooled condenser (Solar Millennium 2009a, AFC §§ 2.1, 2.5).

The project's power cycle would be based on a steam cycle (also known as the Rankine cycle) (Solar Millennium 2009a, AFC § 2.5.2). The solar steam generator heat exchangers would receive heated heat transfer fluid from the solar thermal equipment comprised of arrays of parabolic mirrors that collect energy from the sun. The heated heat transfer fluid would be used to generate steam in the heat exchangers. This steam would then expand through the steam turbine generators to produce electrical power.

The project would utilize one natural gas-fired auxiliary boiler to reduce startup time and to keep the temperature of the heat transfer fluid above its relatively high freezing point (54 degrees Fahrenheit [°F]). Except during startup, the project would not use fossil fuel to generate electricity.

D.3.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Project Energy Requirements and Energy Use Efficiency

Ridgecrest Solar would consume insignificant amounts of fossil fuel for power generation. It would consume fossil fuel only to reduce startup time and to keep the temperature of the heat transfer fluid above its relatively high freezing point.

The project would require approximately 35 million British thermal units of propane per hour (MMBtu/hr) for approximately 30 minutes per day for startup and approximately 8 MMBtu/hr of propane only during cold winter nights for freeze protection (approximately 100 hours per year) (Solar Millennium 2009 a, AFC §§ 2.5.2, 2.5.3.3, 2.5.5.1), at a nominal rate of 7,200 MMBtu per year (MMBtu/yr) or approximately 82,000 gallons per year. Compared to a typical fossil fuel-fired power plant of equal capacity, and compared to the relatively considerable resources of fossil fuel in California (see below in **ADVERSE EFFECTS ON ENERGY SUPPLIES AND RESOURCES**), this rate is not significant. Propane is a relatively efficient form of fossil fuel, more efficient than natural gas and fuel oil.

The applicant estimates an average overall steam cycle efficiency of 38% for Ridgecrest Solar (Solar Millennium 2009a, AFC Figure 2-7). There are currently no legal or industry standards for measuring the efficiency of solar thermal power plants (CEC 2008d).

Therefore, staff compares the steam cycle efficiency of Ridgecrest Solar to the average efficiency of the typical modern steam turbines currently available in the market. The efficiency figures for these turbines range from 35% to 40%. The project's thermal efficiency of 38% is comparable to this industry figure.

Therefore, staff considers the impact of the project's fuel consumption on energy supplies and energy efficiency to be less than significant.

Adverse Effects on Energy Supplies and Resources

The applicant has described its sources of propane for the project (Solar Millennium 2009a, AFC § 2.5.5.1). Propane is normally created as a by-product of petroleum refining and from natural gas production. Petroleum products and natural gas (with California's access to natural gas resources from the Rocky Mountains, Canada and the southwest) represent considerable energy resources in California. Propane supplies in California amount to approximately 630 million gallons per year from refineries alone. This is only about 60% of California's total propane supply. Compared to this figure, the 0.082-million gallons (7,200 MMBtu) per year needed for Ridgecrest Solar is not significant. Therefore, it appears highly unlikely that the project would create a substantial increase in fossil fuel demand.

Additional Energy Supply Requirements

There appears to be no real likelihood that Ridgecrest Solar would require the development of additional energy supply capacity (see above in **ADVERSE EFFECTS ON ENERGY SUPPLIES AND RESOURCES**).

Compliance with Energy Standards

No standards apply to the efficiency of Ridgecrest Solar or other non-cogeneration projects.

Alternatives to Reduce Wasteful, Inefficient, and Unnecessary Energy Consumption

Staff typically evaluates the project alternatives to determine if alternatives exist that could reduce the project's fuel use. The evaluation of alternatives to the project (that could reduce wasteful, inefficient, or unnecessary energy consumption) requires the examination of the project's energy consumption.

Efficiency of Alternatives to the Project

Please see the project alternatives discussed below.

Alternative Generating Technologies

Alternative generating technologies for Ridgecrest Solar are considered in the AFC (Solar Millennium 2009a, AFC § 4.10). For purposes of this analysis, natural gas, oil, coal, nuclear, geothermal, biomass, hydroelectric, wind and solar photovoltaic technologies were all considered. Because this project would consume insignificant amounts of fossil fuel for power production (only during startup), staff believes that the Ridgecrest Solar project would not constitute a significant adverse impact on fossil fuel energy resources compared to feasible alternatives.

The solar insolation falling on the earth's surface can be regarded as an energy resource. Since this energy is inexhaustible, its consumption does not present the concerns inherent in fossil fuel consumption. What is of concern, however, is the extent of land area required to capture this solar energy and convert it to electricity. Setting aside hundreds or thousands of acres of land for solar power generation removes it from alternative uses.

To assess the Ridgecrest Solar's land use efficiency staff proposes to compare the land use efficiency of the solar projects currently before the Commission to the Ridgecrest Solar. This comparison will help determine a range of viable efficiencies and where the Ridgecrest Solar falls.

As this is written, there are currently four solar power plant projects that have progressed significantly through the Energy Commission siting process. These projects' power and energy output, and the extent of the land occupied by them, are summarized in **Efficiency Table 1**, below. The solar land use efficiency for a typical natural gas-fired combined cycle power plant is shown only for comparison.

Ridgecrest Solar would produce power at the rate of 250 MW net, and would generate energy at the rate of 500,000 MW-hours net per year, while occupying 1,440 acres (Solar Millennium 2009a, AFC §§ 2.0, 2.1, 2.2.1).

Staff calculates power-based land use efficiency thus:

Power-based efficiency: $250 \text{ MW} \div 1,440 \text{ acres} = 0.17 \text{ MW/acre}$ or **6.0 acres/MW**

Staff calculates energy-based land use efficiency thus:

Energy-based efficiency: $500,000 \text{ MWh/year} \div 1,440 \text{ acres} = 347 \text{ MWh/acre-year}$

As seen in **Efficiency Table 1**, Ridgecrest Solar, employing the linear parabolic trough technology, is slightly less efficient in use of land than the Beacon Solar Energy Project, which uses the same technology. Ridgecrest Solar is more efficient in use of land than the Ivanpah SEGS project, which employs BrightSource power tower technology, the Calico Solar project, and the Stirling Energy Systems Solar Two project.

Alternatives to Reduce Solar Land Use Impacts

Building and operating a natural gas-fired combined cycle power plant would yield much greater land use efficiency than any solar power plant; see **Efficiency Table 1**. However, this would not achieve the basic project objective, to generate electricity from the renewable energy of the sun and would not further the state's renewable energy development and green-house gas reduction goals.

**Efficiency Table 1
Solar Land Use Efficiency**

Project	Generating Capacity (MW net)	Annual Energy Production (MWh net)	Annual Fuel Consumption (MMBtu LHV)	Footprint (Acres)	Land Use Efficiency (Power-Based) (MW/acre)	Land Use Efficiency (Energy – Based) (MWh/acre-year)	
						Total	Solar Only ¹
Ridgecrest Solar (09-AFC-6)	250	500,000	72,00	1,440	0.17	347	346
Beacon Solar (08-AFC-2)	250	600,000	36,000	1,240	0.20	484	480
Ivanpah SEGS (07-AFC-5)	400	960,000	432,432	3,744	0.11	256	238
SES Solar Two (08-AFC-5)	750	1,620,000	0	6,500	0.12	249	249
Calico Solar (08-AFC-13)	850	1,840,000	0	8,200	0.11	224	224
Avenal Energy (08-AFC-1) ²	600	3,023,388	24,792,786	25	24.0	120,936	N/A

1 Net energy output is reduced by natural gas-fired combined cycle proxy energy output; see **Efficiency Appendix A**.

2 Example natural gas-fired combined cycle plant.

Building a solar power plant employing a different technology, such as the BrightSource power tower technology of the Ivanpah SEGS project or the Stirling Engine technology of the SES Solar projects, would reduce the solar land use efficiency of Ridgecrest Solar by more than a third.

Alternative Heat Rejection System

The applicant proposes to employ a dry cooling system (air-cooled condensers) as the means for rejecting power cycle heat from the steam turbines (Solar Millennium 2009a, AFC §§ 2.5.1, 2.5.5.2). An alternative heat rejection system would utilize evaporative cooling towers.

The local climate in the project area is characterized by high temperatures and low relative humidity (low wet-bulb temperature). In low temperatures and high relative humidity (low dry-bulb temperature), the air-cooled condenser performs relatively efficiently compared to the evaporative tower. However, at the project area (low wet-bulb temperature and high dry-bulb temperature) the air-cooled condenser performance is relatively poor compared to that of an evaporative cooling tower. Furthermore, the performance of the heat rejection system affects the performance of the steam turbine, impacting turbine efficiency. However, to conserve water in the project site's desert environment, the applicant proposes to employ dry cooling. Even though evaporative cooling could offer greater efficiency, staff believes the applicant's selection of dry cooling is a reasonable tradeoff as it would prevent potentially significant environmental impacts that could result from consumption of the large quantities of water required by wet cooling.

D.3.4.3 CEQA LEVEL OF SIGNIFICANCE

CEQA guidelines state that the environmental analysis "...shall describe feasible measures which could minimize significant adverse impacts, including where relevant, inefficient and unnecessary consumption of energy" (Title 14 CCR §15126.4[a][1]). Appendix F of the guidelines further suggests consideration of such factors as the project's energy requirements and energy use efficiency; its effects on local and regional energy supplies and energy resources; its requirements for additional energy supply capacity; its compliance with existing energy standards; and any alternatives that could reduce the wasteful, inefficient, and unnecessary consumption of energy (Title 14, CCR §15000 et seq., Appendix F).

The inefficient and unnecessary consumption of energy, in the form of non-renewable fuels such as natural gas and oil, constitutes an adverse environmental impact. An adverse impact can be considered significant if it results in:

- Adverse effects on local and regional energy supplies and energy resources;
- A requirement for additional energy supply capacity;
- Noncompliance with existing energy standards; or
- The wasteful, inefficient, and unnecessary consumption of fuel or energy.

The discussions under **FOSSIL FUEL USE EFFICIENCY** and **SOLAR LAND USE EFFICIENCY** in Subsection **D.3.3** also describe the CEQA level of significance as related to power plant efficiency.

D.3.5 NORTHERN UNIT ALTERNATIVE

The Northern Unit Alternative would be a 146 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because (1) it eliminates about 42 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources (desert tortoise and Mohave ground squirrel), cultural resources, and recreational uses, and (2) avoids constructing a solar facility in the Mohave Ground Squirrel Conservation Area (MGSCA).

The Northern Unit Alternative would consist of 167 solar collector array loops with a net generating capacity of approximately 146 MW. The total disturbance area would be approximately 1134 acres of land. This alternative would retain 58 percent of the proposed solar array loops and would affect 58 percent of the land of the proposed 250 MW project. The boundaries of the Northern Unit Alternative are shown in **Alternatives Figure 1**.

The reduction in power output would likely result in proportionally reducing the consumption of fossil fuel; as with the original project, the fossil fuel impact would be insignificant. The land-use efficiency would not change because the size of the land to be occupied by the facility (power block and solar field) and the power output would be reduced proportionally.

D.3.6 SOUTHERN UNIT ALTERNATIVE

The Southern Unit Alternative would be a 104 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because it eliminates about 58 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources, and cultural resources.

The Southern Unit Alternative would consist of 119 solar array loops with a net generating capacity of approximately 104 MW. The total disturbance area would be approximately 908 acres of land. This alternative would retain 42 percent of the proposed solar array loops and would affect 42 percent of the land of the proposed 250 MW project.

The boundaries of the Southern Unit Alternative are shown in **Alternatives Figure 2**. This area would avoid a large portion of the El Paso Wash and sensitive biological resources, including areas that were mapped as occupied tortoise and Mohave ground squirrel habitat (live tortoise and/or active burrows and sign).

The reduction in power output would likely result in proportionally reducing the consumption of fossil fuel; as with the original project, the fossil fuel impact would be

insignificant. The land-use efficiency would not change because both, the size of the land to be occupied by the facility (power block and solar field) and the power output would be reduced proportionally.

D.3. 7 ORIGINAL PROPOSED PROJECT ALTERNATIVE

The Original Proposed Project Alternative would be a 250 MW solar facility as originally proposed by Solar Millennium. This alternative is analyzed because it would reduce the amount of land developed within the Mojave Ground Squirrel Conservation Area and it could transmit the full 250 MW of power that Solar Millennium has requested.

The Original Proposed Project Alternative would consist of 278 solar array loops with a net generating capacity of approximately 250 MW. The total disturbance area would be approximately 1,794 acres of land. A shorter transmission interconnection – 1,250 feet as compared to the proposed project interconnection of 3,900 feet – would be needed.

The boundaries of the Original Proposed Project Alternative are shown in **Alternatives Figure 3**. This project footprint contains two desert ephemeral washes that would require redirection and smaller dry desert washes also traverse the site. In addition this site is the location of prime desert tortoise and Mojave ground squirrel habitat.

Both, the power output to be generated and the quantities of fossil fuel to be consumed by this alternative would remain unchanged; as with the original project, the fossil fuel impact would be insignificant. The land-use efficiency would not change because the size of the land to be occupied by the facility (power block and solar field) and the power output would remain unchanged.

D.3.8 NO PROJECT/NO ACTION ALTERNATIVES

NO PROJECT/NO ACTION ALTERNATIVE #1

No Action on Ridgecrest Solar Power Project application and on CDCA land use plan amendment

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site and no ground disturbance. The decreased reliance on fossil fuel and increased reliance on renewable energy resources that would occur with the proposed project would not occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet

State and Federal mandates, and those projects would have similar impacts in other locations

NO PROJECT/NO ACTION ALTERNATIVE #2

No Action on Ridgecrest Solar Power Project and amend the CDCA land use plan to make the area available for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site will be developed with another solar technology. Construction and operation requirements for solar technologies vary; however, they would all decrease reliance on fossil fuel, and would increase reliance on renewable energy resources as with the proposed project.

NO PROJECT/NO ACTION ALTERNATIVE #3

No Action on Ridgecrest Solar Power Project application and amend the CDCA land use plan to make the area unavailable for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended so no solar projects can be approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no construction of a solar facility. Therefore, there would be no decreased reliance on fossil fuel and increased reliance on renewable energy resources as with the proposed project. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.3.9 CUMULATIVE IMPACT ANALYSIS

There are no nearby power plant projects or other projects consuming large amounts of fossil fuel that hold the potential for cumulative energy consumption impacts when aggregated with the project, because the amount of fuel to be consumed by Ridgecrest Solar would be insignificant compared to the considerable resources of fossil fuel, including propane, in California.

Staff believes that the construction and operation of the project would not create indirect impacts (in the form of additional fuel consumption) that would not have otherwise occurred without this project. Because Ridgecrest Solar would consume significantly

less fossil fuel than a typical fossil fuel-fired power plant, it should compete favorably in the California power market and replace fossil fuel burning power plants. The project would therefore cause a positive impact on the cumulative amount of fossil fuel consumed for power generation.

C.3.10 COMPLIANCE WITH LORS

No federal, state, or local/county laws, ordinances, regulations, and standards (LORS) apply to the efficiency of this project.

C.3.11 NOTEWORTHY PUBLIC BENEFITS

Ridgecrest Solar would employ an advanced solar thermal technology. Solar energy is renewable and unlimited. The project would have a less than significant adverse impact on nonrenewable energy resources. Consequently, the project would help in reducing California's dependence on fossil fuel-fired power plants.

C.3.12 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

No conditions of certification are proposed.

C.3.13 CONCLUSIONS

FOSSIL FUEL ENERGY USE

Ridgecrest Solar, if constructed and operated as proposed, would use solar energy to generate most of its capacity, consuming insignificant amounts of fossil fuel for power production. The project would decrease reliance on fossil fuel, and would increase reliance on renewable energy resources. It would not create significant adverse effects on energy supplies or resources, would not require additional sources of energy supply, and would not consume energy in a wasteful or inefficient manner. No energy standards apply to this project. Staff therefore concludes that this project would present no significant adverse impacts on energy resources.

No cumulative impacts on energy resources are likely. Facility closure would not likely present significant impacts on electric system efficiency.

LAND USE

Ridgecrest Solar, if constructed and operated as proposed, would occupy approximately six acres per MW of power output, a figure less than that of some other solar power technologies. Employing a more land-intensive solar technology, such as the BrightSource power tower technology or Stirling Engine technology, would almost halve the land use efficiency..

C.3.14 REFERENCES

CEC 2008d – Report of Conversation between Steve Baker (CEC staff, Power Plant Siting Division) and Golam Kibrya (CEC staff, Energy Resource and Development Division). February 22, 2008.

Solar Millennium 2009a- Solar Millennium (tn: 52939). Application for Certification Vol 1 & 2, dated 8/24/2009.

EFFICIENCY APPENDIX A

SOLAR POWER PLANT EFFICIENCY CALCULATION

GAS-FIRED PROXY

In calculating the efficiency of a solar power plant, it is desired to subtract the effect of natural gas burned for morning startup, cloudy weather augmentation and Therminol freeze protection. As a proxy, we will use an average efficiency based on several recent baseload combined cycle power plant projects in the Energy Commission siting process. Baseload combined cycles were chosen because their intended dispatch most nearly mirrors the intended dispatch of solar plants, that is, operate at full load in a position high on the dispatch authority's loading order.

The most recent such projects are:

Colusa Generating Station (06-AFC-9)

Nominal 660 MW 2-on-1 Combined Cycle with GE Frame 7FA CGTs
Air cooled condenser, evaporative inlet air cooling
Efficiency with duct burners on: 666.3 MW @ 52.5% LHV
Efficiency with duct burners off: 519.4 MW @ 55.3% LHV
Efficiency (average of these two): **53.9% LHV**

San Gabriel Generating Station (07-AFC-2)

Nominal 696 MW 2-on-1 Combined Cycle with Siemens 5000F CGTs
Air cooled condenser, evaporative inlet air cooling
Efficiency with duct burners on: 695.8 MW @ 52.1% LHV
Efficiency with duct burners off: 556.9 MW @ 55.1% LHV
Efficiency (average of these two): **53.6% LHV**

KRCD Community Power Plant (07-AFC-7)

Nominal 565 MW 2-on-1 Combined Cycle with GE or Siemens F-class CGTs
Evaporative cooling, evaporative or fogging inlet air cooling
Efficiency with GE CGTs: 497 MW @ 54.6% LHV
Efficiency with Siemens CGTs: 565 MW @ 56.1% LHV
Efficiency (average of these two): **55.4% LHV**

Avenal Energy (08-AFC-1)

Nominal 600 MW 2-on-1 Combined Cycle with GE Frame 7FA CGTs
Air cooled condenser, inlet air chillers
Efficiency with duct burners on: 600.0 MW @ 50.5% LHV
Efficiency with duct burners off: 506.5 MW @ 53.4% LHV
Efficiency (average of these two): **52.0% LHV**

Average of these four power plants: **53.7% LHV**

D.4 POWER PLANT RELIABILITY

Testimony of Shahab Khoshmashrab

D.4.1 SUMMARY OF CONCLUSIONS

The expected equivalent availability factor for this project is 96-99 percent, which staff believes is achievable (The availability factor of a power plant is the percentage of time it is available to generate power; both planned and unplanned outages subtract from this availability). Based on a review of the proposal, staff concludes that the Ridgecrest Solar Power Project would be built and would operate (throughout its intended 30-year life) in a manner consistent with industry norms for reliable operation. No conditions of certification are proposed.

D.4.2 INTRODUCTION

In this analysis, California Energy Commission (Energy Commission) staff addresses the reliability issues of the Ridgecrest Solar Power Project (Ridgecrest Solar) to determine if the power plant is likely to be built in accordance with typical industry norms for reliable power generation. Staff uses this norm as a benchmark because it ensures that the resulting project would not be likely to degrade the overall reliability of the electric system it serves (see the “Setting” subsection, below).

The scope of this power plant reliability analysis covers:

- Equipment availability;
- Plant maintainability;
- Fuel and water availability; and
- Power plant reliability in relation to natural hazards.

Staff examined the project design criteria to determine if the project is likely to be built in accordance with typical industry norms for reliable power generation. The applicant has not predicted an availability factor for the project, but staff expects this figure to be similar to the other solar power plant projects that are going through the Energy Commission’s licensing process utilizing the same solar thermal technology (parabolic trough). The expected overall availability factor for these projects ranges between 96-99 percent; staff expects the same for Ridgecrest Solar. While these predictions are made by the applicants, staff commonly uses typical industry norms as the benchmark, rather than the applicant’s projection, to evaluate the project’s reliability (see below).

D.4.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

METHOD FOR DETERMINING RELIABILITY

The Energy Commission must make findings as to how a project is designed, sited, and operated in order to ensure its safe and reliable operation (Title 20, CCR §1752[c]).

Staff takes the approach that a project is acceptable if it does not degrade the reliability of the utility system to which it is connected. This is likely the case if a project is at least as reliable as other power plants on that system.

The availability factor of a power plant is the percentage of time it is available to generate power; both planned and unplanned outages subtract from this availability. Measures of power plant reliability are based upon both the plant's actual ability to generate power when it is considered to be available and upon starting failures and unplanned (or forced) outages. For practical purposes, reliability can be considered a combination of these two industry measures, making a reliable power plant one that is available when called upon to operate. Power plant systems must be able to operate for extended periods without shutting down for maintenance or repairs. Achieving this reliability requires adequate levels of equipment availability, plant maintainability with scheduled maintenance outages, fuel and water availability, and resistance to natural hazards. Staff examines these factors for the project and compares them to industry norms. If the factors compare favorably for this project, staff may then conclude that Ridgecrest Solar would be as reliable as other power plants on the electric system and would not degrade system reliability.

D.4.4 PROPOSED PROJECT

D.4.4.1 SETTING AND EXISTING CONDITIONS

In the restructured competitive electric power industry, the responsibility for maintaining system reliability falls largely to the state's control area operators, such as the California Independent System Operator (California ISO), that purchase, dispatch, and sell electric power throughout the state. Determining how the California ISO and other control area operators would ensure system reliability has been an ongoing effort. Protocols that allow sufficient reliability to be maintained under the competitive market system have been developed and put in place. "Must-run" power purchase agreements and "participating generator" agreements are two mechanisms that have been employed to ensure an adequate supply of reliable power.

The California ISO's mechanisms to ensure adequate power plant reliability apparently were devised under the assumption that the individual power plants that compete to sell power into the system will each exhibit a level of reliability similar to that of power plants of past decades. However, there has been valid cause to believe that, under free market competition, financial pressures on power plant owners to minimize capital outlays and maintenance expenditures may act to reduce the reliability of many power plants, both existing and newly constructed (McGraw-Hill 1994). It is possible that, if significant numbers of power plants were to exhibit individual reliability sufficiently lower than this historical level, the assumptions used by California ISO to ensure system reliability would prove invalid, with potentially disappointing results. Accordingly, staff has recommended that power plant owners continue to build and operate their projects to the level of reliability to which all in the industry are accustomed.

As part of its plan to provide needed reliability, the applicant proposes to operate the 250-megawatt (MW) (net power output) Ridgecrest Solar, a solar thermal power plant

facility employing an advanced solar power technology. This project, using renewable solar energy, would provide dependable power to the grid, generally during the hours of peak power consumption by the interconnecting utility(s). This project would help serve the need for renewable energy in California, as all its generated electricity would be produced by a reliable source of energy that is available during the hot summer afternoons, when power is needed most.

The expected availability factor for the project is 96-99 percent.

D.4.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

EQUIPMENT AVAILABILITY

Equipment availability would be ensured by adoption of appropriate quality assurance/quality control (QA/QC) programs during the design, procurement, construction, and operation of the plant and by providing for adequate maintenance and repair of the equipment and systems discussed below.

Quality Control Program

Staff expects the project's QA/QC program to be typical of the power industry. Equipment would be purchased from qualified suppliers based on technical and commercial evaluations. Suppliers' personnel, production capability, past performance, QA programs, and quality history would be evaluated. The project owner would perform receipt inspections, test components, and administer independent testing contracts. Staff expects that implementation of this program would result in typical reliability of design and construction. To ensure this implementation, staff has proposed appropriate conditions of certification in the section of this document entitled **Facility Design**.

PLANT MAINTAINABILITY

Equipment Redundancy

The project, as proposed in the AFC, would be able to operate only when the sun is shining. Maintenance or repairs could be done when the plant is shut down at night. This would help to enhance the project's reliability. The nature of solar thermal generating technology also provides inherent redundancy; the series-parallel arrangement of solar collector assemblies would allow for reduced output generation if one (or possible several) rows of solar collectors were to require service or repair (SM 2009a, AFC §§ 2.5.1, 2.5.3). This redundancy would allow service or repair to be done during sunny days when the plant is in operation, if required.

Major plant systems are designed with adequate redundancy to ensure their continued operation if equipment fails.

Maintenance Program

Equipment manufacturers provide maintenance recommendations for their products, and the applicant would most likely base the project's maintenance program on those recommendations. Such a program would encompass both preventive and predictive

maintenance techniques. Maintenance outages would probably be planned for periods of low electricity demand. Staff expects that the project would be adequately maintained to ensure an acceptable level of reliability.

FUEL AND WATER AVAILABILITY

The long-term availability of fuel and of water for cooling or process use is necessary to ensure the reliability of any power plant. The need for reliable sources of fuel and water is obvious; lacking long-term availability of either source, the service life of the plant could be curtailed, threatening both the power supply and the economic viability of the plant.

Fuel Availability

Ridgecrest Solar would consume insignificant amounts of propane for power generation. The sole consumption of propane would be to reduce startup time and to keep the temperature of the heat transfer fluid above its freezing point.

Propane would be delivered to the Ridgecrest Solar site via trucks from a local distributor (SM 2009a, AFC § 2.5.5.1). Propane is normally created as a by-product of petroleum refining and from natural gas production. Petroleum products and natural gas (with California's access to natural gas resources from the Rocky Mountains, Canada and the southwest) represent considerable energy resources in California. Propane supplies in California amount to approximately 630 million gallons per year from refineries alone. This is only about 60% of California's total propane supply. Compared to this figure, the 0.082-million gallons per year needed for Ridgecrest Solar is very small. Staff believes that there would be adequate propane supply and pipeline capacity to meet the project's needs.

Water Supply Reliability

Ridgecrest Solar has proposed to use well water from the Indian Wells Valley Water District for domestic and industrial water needs, including steam cycle makeup, mirror washing, service water and fire protection water. The project would be dry cooled, so no water would be required for power plant cooling. According to the **Soil and Water Resources** section of this document, the proposed use of onsite groundwater for power plant cooling would create significant unmitigated adverse impacts related to water resources. Therefore, at this time, staff cannot conclude that this source of water supply is a reliable source of water for the project.

POWER PLANT RELIABILITY IN RELATION TO NATURAL HAZARDS

Natural forces can threaten the reliable operation of a power plant. Tsunamis (tidal waves) and seiches (waves in inland bodies of water) are not likely to present hazards for this project, but seismic shaking (earthquakes), flooding and high winds could present credible threats to the project's reliable operation (SM 2009a, AFC §§ 5.5, 5.17).

Seismic Shaking

The project will be designed and constructed to the latest applicable LORS (SM 2009a, AFC Appendix C). Compliance with current seismic design LORS represents an

upgrading of performance during seismic shaking compared to older facilities since these LORS have been continually upgraded. Because it would be built to the latest seismic design LORS, this project would likely perform at least as well as, and perhaps better than, existing plants in the electric power system. Staff has proposed conditions of certification to ensure this; see the section of this document entitled **FACILITY DESIGN**. In light of the general historical performance of California power plants and the electrical system in seismic events, staff has no special concerns with the power plant's functional reliability during earthquakes. Also see the **GEOLOGY AND PALEONTOLOGY** section of this document.

Flooding

Portions of the site lie within a 100-year or 500-year flood plain (SM 2009a, AFC § 5.17.2.8). Project features would be designed and built to provide adequate levels of flood resistance. Staff believes there are no special concerns with power plant functional reliability due to flooding. For further discussion, see **SOIL AND WATER RESOURCES** and **GEOLOGY AND PALEONTOLOGY**.

High Winds

High winds are common in the region of the site, which could potentially cause damage to the solar mirrors. Project features would be built to withstand wind loading. Design would be in accordance with applicable LORS, including the latest California Building Code (see the **FACILITY DESIGN** section of this document). Staff believes there are no special concerns with power plant functional reliability due to wind.

COMPARISON WITH EXISTING FACILITIES

The North American Electric Reliability Corporation (NERC) maintains industry statistics for availability factors (as well as other related reliability data). The NERC regularly polls North American utility companies on their project reliability through its Generating Availability Data System and periodically summarizes and publishes those statistics on the Internet at <<http://www.nerc.com>>. Energy Commission staff typically compares the applicant's claims for reliability to the statistical reliability of similar power plants. Because solar technology is relatively new and the technologies employed so varied, no NERC statistics are available for solar power plants. Staff's typical comparison with other existing facilities thus cannot be accomplished. But, based on experience with power plants and due the proven solar thermal technology proposed for this project, staff believes that the stated range of availability factor for the project is reasonable and likely achievable.

D.4.4.3 CEQA LEVEL OF SIGNIFICANCE

This does not apply to power plant reliability.

D.4.5 NORTHERN UNIT ALTERNATIVE

The Northern Unit Alternative would be a 146 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because (1) it eliminates about 42 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources

(desert tortoise and Mohave ground squirrel), cultural resources, and recreational uses, and (2) avoids constructing a solar facility in the Mohave Ground Squirrel Conservation Area (MGSCA).

The Northern Unit Alternative would consist of 167 solar collector array loops with a net generating capacity of approximately 146 MW. The total disturbance area would be approximately 1134 acres of land. This alternative would retain 58 percent of the proposed solar array loops and would affect 58 percent of the land of the proposed 250 MW project. The boundaries of the Northern Unit Alternative are shown in **Alternatives Figure 1**.

Staff's methods of analysis and conclusions as related to Power Plant Reliability would remain unchanged. This alternative would be built and would operate in a manner consistent with industry norms for reliable operation.

D.4.6 SOUTHERN UNIT ALTERNATIVE

The Southern Unit Alternative would be a 104 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because it eliminates about 58 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources, and cultural resources.

The Southern Unit Alternative would consist of 119 solar array loops with a net generating capacity of approximately 104 MW. The total disturbance area would be approximately 908 acres of land. This alternative would retain 42 percent of the proposed solar array loops and would affect 42 percent of the land of the proposed 250 MW project.

The boundaries of the Southern Unit Alternative are shown in **Alternatives Figure 2**. This area would avoid a large portion of the El Paso Wash and sensitive biological resources, including areas that were mapped as occupied tortoise and Mohave ground squirrel habitat (live tortoise and/or active burrows and sign).

Staff's methods of analysis and conclusions as related to Power Plant Reliability would remain unchanged. This alternative would be built and would operate in a manner consistent with industry norms for reliable operation.

D.4. 7 ORIGINAL PROPOSED PROJECT ALTERNATIVE

The Original Proposed Project Alternative would be a 250 MW solar facility as originally proposed by Solar Millennium. This alternative is analyzed because it would reduce the amount of land developed within the Mojave Ground Squirrel Conservation Area and it could transmit the full 250 MW of power that Solar Millennium has requested.

The Original Proposed Project Alternative would consist of 278 solar array loops with a net generating capacity of approximately 250 MW. The total disturbance area would be

approximately 1,794 acres of land. A shorter transmission interconnection – 1,250 feet as compared to the proposed project interconnection of 3,900 feet – would be needed.

The boundaries of the Original Proposed Project Alternative are shown in **Alternatives Figure 3**. This project footprint contains two desert ephemeral washes that would require redirection and smaller dry desert washes also traverse the site. In addition this site is the location of prime desert tortoise and Mojave ground squirrel habitat.

Staff's methods of analysis and conclusions as related to Power Plant Reliability would remain unchanged. This alternative would be built and would operate in a manner consistent with industry norms for reliable operation.

D.4.8 NO PROJECT/NO ACTION ALTERNATIVES

NO PROJECT/NO ACTION ALTERNATIVE #1

No Action on Ridgecrest Solar Power Project application and on CDCA land use plan amendment

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site and no ground disturbance. The decreased reliance on fossil fuel and increased reliance on renewable energy resources that would occur with the proposed project would not occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations

NO PROJECT/NO ACTION ALTERNATIVE #2

No Action on Ridgecrest Solar Power Project and amend the CDCA land use plan to make the area available for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site will be developed with another solar technology. Construction and operation requirements for

solar technologies vary; however, they would all decrease reliance on fossil fuel, and would increase reliance on renewable energy resources as with the proposed project.

NO PROJECT/NO ACTION ALTERNATIVE #3

No Action on Ridgecrest Solar Power Project application and amend the CDCA land use plan to make the area unavailable for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended so no solar projects can be approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no construction of a solar facility. Therefore, there would be no decreased reliance on fossil fuel and increased reliance on renewable energy resources as with the proposed project. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

D.4.8 NOTEWORTHY PUBLIC BENEFITS

This project, if successful, would help serve the need for renewable energy in California, as all of the electricity generated would be produced by a reliable source of energy that is available during the hot summer afternoons, when power is needed most.

D.4.9 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

No Conditions of Certification are proposed.

D.4.10 CONCLUSIONS

The expected equivalent availability factor for this project is 96-99 percent, which staff believes is achievable (The availability factor of a power plant is the percentage of time it is available to generate power; both planned and unplanned outages subtract from this availability). Based on a review of the proposal, with the exception of the source of water supply currently selected by the applicant (see the **SOIL AND WATER RESOURCES** section of this document), staff concludes that the Ridgecrest Solar Power Project would be built and would operate (throughout its intended 30-year life) in a manner consistent with industry norms for reliable operation. No conditions of certification are proposed.

D.4.11 REFERENCES

SM 2009a - Solar Millenium LLC/J. Eichhammer (tn 53100). AFC for Ridgecrest Solar Power Project, dated 8/31/2009. Submitted to CEC/Docket Unit on 9/1/2009.

D.5 TRANSMISSION SYSTEM ENGINEERING

Testimony of Ajoy Guha, P. E. and Mark Hesters

D.5.1 SUMMARY OF CONCLUSIONS

The proposed interconnecting facilities including the Ridgecrest Solar Power Project (RSPP) 230 kV switchyard, the generator 230 kV overhead tie line and termination to the new Southern California Edison's (SCE) Millennium 230 kV substation are adequate and in accordance with industry standards and good utility practices, and are acceptable to staff according to engineering Laws, Ordinances, Regulations and Standards (LORS).

The California Independent System Operator's (California ISO) Phase I Interconnection Study (Phase I Study) does not provide a meaningful forecast of the transmission reliability impacts of the RSPP. The Phase I Study analyzed the impacts of 12,305 MW of generation in the RSPP cluster; however, after a December 2010 milestone, most of the generation dropped out of the interconnection process and only 2,065 MW remained. Staff expects that the reliability impacts of 2,065 MW will be significantly smaller than the impacts of 12,305 MW. The California ISO Phase II Interconnection Study (Phase II Study) is being performed based on the 2,065 MW in the RSPP cluster. The Phase II Study will be completed by September 2010, but will not be available in time to be incorporated in staff's analysis of the RSPP. Condition of Certification TSE-5 requires that the Phase II Study be provided to the California Energy Commission before the start of transmission facility construction.

Because the Phase 1 Study does not provide a meaningful analysis of the reliability impacts of interconnecting the RSPP, staff is unable to determine whether or not the project will comply with reliability LORS.

D.5.2 INTRODUCTION

The Transmission System Engineering (TSE) analysis examines whether or not the facilities associated with the proposed interconnection conforms to all applicable LORS required for safe and reliable electric power transmission. Staff's analysis evaluates the power plant switchyard, outlet line, termination and downstream facilities identified by the applicant. Additionally, under the CEQA, the Energy Commission must conduct an environmental review of the "whole of the action," which may include facilities not licensed by the Energy Commission (California Code of Regulations, title 14, §15378). Therefore, the Energy Commission must identify the system impacts and necessary new or modified downstream transmission facilities (beyond the first point of the proposed interconnection) that are required for interconnection and represent the "whole of the action." The downstream network upgrade mitigation measures that will be required to maintain system reliability for the addition of the power plant, are used to identify the requirement for any additional CEQA analysis for potential indirect impacts.

According to the previous guidelines staff so far relied on the System Impact Study (SIS) and Facility Study (FS) as well as the review of these studies by the agencies responsible for ensuring the adjacent interconnecting grid meets reliability standards.

The proposed RSPD would interconnect to the SCE transmission network and requires analysis by SCE and approval of the California ISO. However, the California ISO's generator interconnection study process under the new LGIP Tariff is in transition from a queue or serial SIS to a cluster window process for the Phase I and Phase II Studies. The Phase I Study is similar to the former System Impact Study except it is now performed for a group of projects in the same geographical area of a utility that apply for interconnection in the same request window. The Phase II Study is performed after generators in each cluster meet specific milestones required to stay in the generator interconnection queue. The Phase II Study is then performed only on the generators left in the queue. The interconnection studies analyze the effect of the proposed project on the ability of the transmission network to meet reliability standards (California ISO 2009a).

SCE'S ROLE

SCE is responsible for ensuring electric system reliability in the SCE system for addition of the proposed generating plant. SCE will provide the analysis and reports in their Phase I and Phase II Studies, and their approval for the facilities and changes required in the SCE system for the proposed transmission modifications.

CALIFORNIA ISO'S ROLE

The California ISO is responsible for ensuring electric system reliability for all participating transmission owners and is also responsible for developing the standards necessary to achieve system reliability. The California ISO is responsible for completing the studies of the SCE system to ensure adequacy of the proposed transmission interconnection. The California ISO will determine the reliability impacts of the proposed transmission modifications on the SCE transmission system in accordance with all applicable reliability criteria. According to the California ISO Tariff, the California ISO will determine the "Need" for transmission additions or upgrades downstream from the interconnection point to ensure reliability of the transmission grid. The California ISO will, therefore, review the Phase I Study performed by SCE and/or any third party, provide their analysis, conclusions and recommendations. Upon completion of the SCE Phase II Study based on the expected mid-2013 commercial operation date (COD) or current COD the California ISO would execute a Large Generator Interconnection Agreement (LGIA) between the California ISO and the project owner. If necessary, the California ISO may provide written and verbal testimony on their findings at the Energy Commission hearings.

D.5.3 PROPOSED PROJECT

D.5.3.1 SETTING AND EXISTING CONDITIONS

The RSPD would be located in a 1,760-acre site in the high northern Mojave Desert in the northeastern Kern County about five miles southwest of the City of Ridgecrest. The project's nominal 250 MW output would be produced by two solar fields (one would be located north of Brown Road and the other south of Brown Road), and facilities on site would include a power block and a switchyard.

The RSPP, a solar plant, would consist of a steam turbine generator (STG) unit operating with a total 250 MW nominal output. The STG unit would be rated at 300 MVA, and connected by an 18 kV line through a 12,000-ampere bus duct, 12,000-ampere 24 kV circuit breaker and three disconnect switches to the low voltage terminal of a dedicated 220/275/330MVA, 18/230 kV generator step-up (GSU) transformer with an impedance of 8 percent @220 MVA (SM 2009a, Pages 2-1 to 2-3 and SM 2009d, Transmission System Design).

SWITCHYARD AND INTERCONNECTION FACILITIES

The high voltage terminals of the GSU transformer would be connected to the 230 kV switchyard bus by short overhead conductors through a 3,000-ampere circuit 230 kV breaker and two disconnect switches.

The new RSPP 230 kV switchyard would be interconnected to the SCE system by building a new 0.5-mile long single circuit overhead line with 715.5 kcmil steel-reinforced aluminum conductors (ACSR) on 75 to 120-foot steel poles. The applicant would build, own and operate the RSPP switchyard and the generator tie line (SM 2009d, Transmission System Design).

The generator interconnection tie line would terminate to the SCE Kramer-Inyokern 230 kV line by building a new SCE 230 kV substation adjacent to the plant facility. The existing Kramer-Inyokern 230 kV line would be rerouted around the project site and looped into the new SCE 230 kV substation. The new substation is propose as a 3,000-ampere ring bus configuration with five 3,000-ampere 230 kV breakers (63 kA short circuit duty) and ten 3,000-ampere disconnect switches. SCE would build, own and operate new 230 kV substation and transmission outlets within the substation fence line (SM 2009d, Transmission System Design).

The configuration of the RSPP 230 kV switchyard, the generator 230 kV overhead tie line to the new SCE Millennium 230 kV substation and its termination at the new 230 kV substation are adequate and in accordance with industry standards and good utility practices, and are acceptable to staff. The proposed Conditions of Certification TSE-1 through TSE-8 ensure that the proposed facilities are designed, built and operated in accordance with good utility practices and applicable LORS.

D.5.3.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

For the interconnection of a proposed generating unit or transmission facility to the grid, the interconnecting utility and the control area operator are responsible for ensuring grid reliability. For the RSPP, SCE and the California ISO are responsible for ensuring grid reliability.

The California ISO's generator interconnection study process is in transition from a serial process to an interconnection window cluster study process. The RSPP was studied under the window cluster process and the transmission reliability impacts of the proposed project are studied in the Phase I and Phase II Studies. The Phase I Study is similar to the former System Impact Study except it is now performed for a group or cluster of projects in the same geographical area of a utility that apply for interconnection in the same request window. The Phase II Study is performed after

generators in each cluster meet specific milestones required to stay in the generator interconnection queue. The Phase II Study is then performed for generators that meet the milestones in each cluster.

The Phase I Studies for projects in the transition cluster were conducted to determine the preferred and alternative generator interconnection methods and to identify any mitigation measures required to ensure system conformance with utility reliability criteria, NERC planning standards, WECC reliability criteria, and California ISO reliability criteria. Staff relies on the studies and any review conducted by the responsible agencies to determine the effect of the projects on the transmission grid and to identify any necessary downstream facilities or indirect project impacts required to bring the transmission network into compliance with applicable reliability standards (NERC2006, WECC 2006, California ISO 2002a, 2007a & 2009a).

The Phase I Study analyzes the grid with and without the generator or generators in a cluster under conditions specified in the planning standards and reliability criteria. The standards and criteria define the assumptions used in the study and establish the thresholds by which grid reliability is determined. The studies must analyze the impact of the projects for their proposed first year(s) of operation and thus are based on a forecast of loads, generation and transmission. Load forecasts are developed by the interconnected utility, which would be SCE in this case. Generation and transmission forecasts are based on the interconnection queue. The studies are focused on thermal overloads, voltage deviations, system stability (excessive oscillations in generators and transmission system, voltage collapse, loss of loads or cascading outages), short circuit duties and substation evaluation

Under the new LGIP, generators are able to choose between either “full capacity” or “energy only” depending on whether or not the generator wants to have the right to generate energy 24-hours per day. A generator that chooses the full capacity option will be required to pay for transmission network upgrades that are needed to allow the generator to operate under virtually any system conditions and as such could sign contracts that allowed them to provide capacity to utilities. Energy only generators would not pay for network transmission upgrades, and essentially would have access to as available transmission capacity, and would likely not be able to sign capacity contracts.

If the studies show that the interconnection of the project or cluster of projects causes the grid to be out of compliance with reliability standards, the study will then identify mitigation alternatives or ways in which the grid could be brought into compliance with reliability standards. If the interconnecting utility determines that the only feasible mitigation includes transmission modifications or additions which require CEQA review as part of the “whole of the action,” the Energy Commission must analyze those modifications or additions according to CEQA requirements. Where the Phase I Study identifies transmission modifications required for the reliable interconnection of a cluster of generators, staff will analyze the proposed generating project’s impact on individual reliability criteria violations to determine whether or not the identified mitigation measures are a reasonably foreseeable consequence of the proposed project.

D.5.3.2.1 Scope of the Transition Cluster Phase I Interconnection Study

The July 28, 2009, Transition Cluster Phase I Study was prepared by the California ISO in coordination with SCE. The Phase I Study analyzed 36 queue generation projects in the East of Lugo SCE area totaling 12,305 MW net generation output, including a proposed 750 MW RSPP which has been reduced to 250 MW (SM 2009c, Transition Cluster Phase I interconnection Study, Page 3). As of December 4, 2009 only 18 projects (2,065 MW) of the original 36 projects remain in the interconnection queue. Reducing the size of the cluster by 18 projects and 10,240 MW means the Phase I Study results no longer provide a meaningful forecast of the reliability impacts of the proposed project or the other projects in the cluster. Staff typically relies on the California ISO Phase I Study to show project compliance with LORS and to indentify the downstream transmission facilities required to reliably interconnect a generator to the existing transmission grid. Thus, the Phase I Study does not provide a meaningful forecast of the reliability impacts of the cluster or the proposed RSPP and consequently the mitigation plan including downstream transmission upgrades is not reasonable for the updated generator cluster.

CEQA requires the analysis of reasonably foreseeable consequences of proposed projects based on the best available information. The California ISO is the reliability authority for generator interconnections and its Phase I Study for the RSPP provides the best available information on the reliability impacts of the proposed project. However, the significant reduction in the number of generators studied in the cluster with the RSPP reduces the Phase 1 Study results to idle speculation. It is not possible to determine the impacts of the proposed project or even the cluster of generators because the size of the cluster has decreased so significantly. The revised 2,065 MW cluster including the RSPP will be analyzed in the Phase II Study and will provide an accurate and acceptable forecast of the reliability impacts of the RSPP and its associated cluster of generator projects.

The Transition Cluster Phase II Study is currently scheduled to be completed by September 2010 and will not be available in time to be incorporated in staff's analysis of the RSPP. If the Phase II Study finds that the RSPP and the remaining projects in its cluster would require the construction or upgrade of downstream transmission facilities in order to maintain grid reliability, those transmission facilities would require a license from the California Public Utilities Commission or other permitting authorities. Staff anticipates that future clusters will likely include fewer generators and the Phase I Studies which are not part of the Transition Cluster will provide less speculative study results and a better forecast of the reasonably foreseeable transmission impacts of a specific generator.

CALIFORNIA ISO REVIEW

In accordance with the new LGIP as in the California ISO Tariff, on satisfactory completion of the Transition Cluster Phase II Study the California ISO instead of issuing a final approval letter would proceed to execute LGIA between the California ISO and the project owner. The California ISO may also provide written and verbal testimony on their findings at the Energy Commission hearings, if necessary.

Performance of the Phase II Study, including the Operation study and execution of the LGIA would ensure system reliability in the California ISO grid and compliance with WECC/NERC and California ISO Planning standards. Condition of Certification TSE-5 requires the project owner to submit these documents to the CEC at least 60-days prior to the start of transmission facility construction (WECC 2006, NERC 2006, California ISO 2002a and 2007a).

D.5.3.3 CEQA LEVEL OF SIGNIFICANCE

Generally staff relies on the California ISO Phase I /System Impact Study to determine whether or not the proposed generation project will likely comply with reliability and to identify the transmission facilities required for reliable interconnection. For the Transition Cluster projects the Phase I Study does not provide an accurate forecast of impacts of the RSPP on the SCE transmission grid. The transmission upgrades identified in the Phase I Study are not reasonably foreseeable consequences of the proposed generating project. Relying on available information, staff is unable to identify any likely indirect project transmission impacts. Upon completion of the Phase II Study and the execution of the LGIA, the impacts of the RSPP on grid reliability will be identified. In order to ensure compliance with reliability LORS, Condition of Certification TSE-5 requires the submittal of the Phase II Study and the executed LGIA prior to the start of construction of transmission facilities (2009d, Phase I Interconnection Study report).

D.5.3.3.1 DOWNSTREAM FACILITIES

The Phase II Study will determine what, if any, downstream reliability upgrades outside the existing substation fence lines will be needed to accommodate the proposed the proposed RSPP including the switchyard, the interconnection tie line and termination at the new SCE 230 kV substation. The study will include the California ISO's approved planned projects in the insufficient SCE east of Lugo area network. Consequently after execution of the LGIA with the applicant, the California ISO/SCE would proceed through the California Public Utilities Commission's Certificate of Public Convenience and Necessity (CPCN) permit process for construction of facilities, which would include any necessary CEQA and or NEPA analysis, related to any potential transmission system upgrades.

D.5.4 NORTHERN UNIT ALTERNATIVE

The Northern Unit Alternative would be a 146 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because (1) it eliminates about 42 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources (desert tortoise and Mohave ground squirrel), cultural resources, and recreational uses, and (2) avoids constructing a solar facility in the Mohave Ground Squirrel Conservation Area (MGSCA).

D.5.4.1 SETTING AND EXISTING CONDITIONS

The Northern Unit Alternative would consist of 167 solar collector array loops with a net generating capacity of approximately 146 MW occupying approximately 1135 acres of

land. This alternative would retain 58 percent of the proposed solar array loops and would affect 58 percent of the land of the proposed 250 MW project. The boundaries of the Northern Unit Alternative are shown in **Alternatives Figure 1**.

D.5.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Similar to the proposed project, the Northern Unit Alternative would transmit power to the grid through the planned SCE 230-kV substation to be located near the proposed project site. The power block covering approximately 18 acres, would remain north of Brown Road, as proposed by the project and would include all operational power facilities, structures, transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system). The proposed transmission line alignment is 3,900 ft and would connect to the proposed switchyard (5.5 acres) adjacent to the existing SCE 230kV transmission line, west of the proposed project. In addition, the site would require access roads, a parking lot, bio-remediation unit and main office building (3 acres) all of which are proposed north of Brown Road within the proposed project footprint (SM 2010a). The proposed 16.3 acre water line would remain at the location as proposed by the project. The Northern Unit Alternative would not require the relocation of the two existing SCE transmission lines. A smaller, 146 MW, project would likely have fewer impacts on existing transmission facilities than the proposed project but these impacts would be identified through the California ISO's Large Generator Interconnection Process.

D.5.4.3 CEQA LEVEL OF SIGNIFICANCE

As stated above, the Northern Unit Alternative is evaluated in this SA/DEIS because it would reduce some impacts of the project. Additionally, the Northern Unit Alternative would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals, while minimizing impacts to the desert environment. A limited acreage alternative was suggested in scoping comments.

D.5.5 SOUTHERN UNIT ALTERNATIVE

The Southern Unit Alternative would be a 104 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because it eliminates about 58 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources, and cultural resources.

D.5.5.1 SETTING AND EXISTING CONDITIONS

The Southern Unit Alternative would consist of 119 solar array loops with a net generating capacity of approximately 104 MW occupying approximately 826 acres of land. This alternative would retain 42 percent of the proposed solar array loops and would affect 42 percent of the land of the proposed 250 MW project.

The boundaries of the Southern Unit Alternative are shown in **Alternatives Figure 2**. This area would avoid a large portion of the El Paso Wash and sensitive biological resources, including areas that were mapped as occupied tortoise and Mohave ground squirrel habitat (live tortoise and/or active burrows and sign).

D.5.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Similar to the proposed project, the Southern Unit Alternative would transmit power to the grid through the planned SCE 230-kV substation to be located near the proposed project site. The power block, spanning approximately 18 acres, would remain north of Brown Road, as proposed by the project and would include all operational power facilities, structures, transmission lines and related electrical system, potable and treated water tanks, and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system). The proposed transmission line alignment is 3,900 ft and would connect to the proposed switchyard (5.5 acres) adjacent to the existing SCE 230kV transmission line, west of the proposed project. In addition, the site would require access roads, a parking lot, bio-remediation unit and main office building (3 acres) all of which are proposed north of Brown Road (AECOM 2009). The proposed 16.3 acre water line would remain at the location as proposed by the project. Similar to the proposed project, the Southern Unit Alternative would require the relocation of the two existing SCE transmission lines, which would require approximately 58.2 acres. A smaller, 104 MW, project would likely have fewer impacts on existing transmission facilities than the proposed project but these impacts would be identified through the California ISO's Large Generator Interconnection Process.

D.5.5.3 CEQA LEVEL OF SIGNIFICANCE

As stated above, the Southern Unit Alternative is evaluated in this SA/DEIS because it would reduce some impacts of the project. Additionally, the Southern Unit Alternative would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals, while minimizing impacts to the desert environment. A limited acreage alternative was suggested in scoping comments.

D.5.6 ORIGINAL PROPOSED PROJECT ALTERNATIVE

The Original Proposed Project Alternative would be a 250 MW solar facility as originally proposed by Solar Millennium. This alternative is analyzed because it would reduce the amount of land developed within the Mojave Ground Squirrel Conservation Area and it could transmit the full 250 MW of power that Solar Millennium has requested.

D.5.6.1 SETTING AND EXISTING CONDITIONS

The Original Proposed Project Alternative would consist of 278 solar array loops with a net generating capacity of approximately 250 MW occupying approximately 1,760 acres of land. This alternative would occupy approximately 755 acres north of Brown Road and approximately 685 acres south of Brown Road. A shorter transmission interconnection would be needed, 1,250 feet as compared to the proposed project interconnection of 3,900 feet.

The boundaries of Original Proposed Alternative are shown in **Alternatives Figure 3**. This project footprint contains two desert ephemeral washes that would require

redirection and smaller dry desert washes also traverse the site. In addition this site is the location of prime desert tortoise and Mojave ground squirrel habitat.

D.5.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Similar to the proposed project, the Original Proposed Project Alternative would transmit power to the grid through the planned SCE 230-kV substation located near the proposed project site and would require infrastructure including a main office building (3 acres), power block, water line, transmission line, switch yard, access roads, parking area, bio-remediation unit and maintenance building (AECOM 2009). The off-site water line covers approximately 18 acres and proposed in the same location as the proposed project. In contrast to the proposed project, the bioremediation unit would be located north of Brown Road within the proposed project footprint. The power block and ancillary facilities would be located south of Brown Road on approximately 18 acres in addition to the transmission line and switch-yard (5.5 acres). The Original Proposed Project Alternative would require the relocation of the two existing SCE transmission lines. However, the proposed realignment would be reduced in length by 550 feet as compared to the proposed project.

As stated above, the Original Proposed Alternative is evaluated in this SA/DEIS because it reduces land developed with the MGSCA. Additionally, the Original Proposed Alternative would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals.

D.5.7 NO PROJECT/NO ACTION ALTERNATIVE

The No Project Alternative under CEQA or the No Action Alternative under NEPA defines the scenario that would exist if the proposed Ridgecrest Solar Power Project were not constructed. The CEQA Guidelines state that “the purpose of describing and analyzing a ‘no project’ alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project” (Cal. Code Regs., tit. 14 § 15126.6(i)). The No Project analysis in this SA/EIR considers existing conditions and “what would be reasonably expected to occur in the foreseeable future if the project were not approved...” (Cal. Code Regs, tit. 14 § 15126.6(e)(2)). Under NEPA, the No Action Alternative is used as a benchmark of existing conditions by which the public and decision makers can compare the environmental effects of the proposed action and the alternatives.

D.5.7.1 SETTING AND EXISTING CONDITIONS

If the No Project/No Action Alternative were selected, the construction and operational impacts of the Ridgecrest Solar Power Project would not occur. There would be no grading of the site, no loss of resources or disturbance of approximately 1944 acres of desert habitat, no impacts to cultural resources, and no installation of power generation and transmission equipment. The No Project/No Action Alternative would also eliminate contributions to cumulative impacts on a number of resources and environmental parameters in Kern County and in the Mojave Desert as a whole.

D.5.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

In the absence of the Ridgecrest Solar Power Project, however, other power plants, both renewable and non-renewable, would have to be constructed to serve the demand for electricity and to meet RPS. If the No Project/No Action Alternative were chosen, other utility-scale solar power facilities may be built, and the impacts to the environment may be similar to those of the proposed project because these technologies require large amounts of land similar to the Ridgecrest Solar Power Project. The No Project/No Action Alternative may also lead to siting of other non-solar renewable technologies to help achieve the California RPS. If the proposed project were not built, California would not benefit from the reduction in greenhouse gases that this facility would provide, and SCE would not receive the 250 MW contribution to its renewable state-mandated energy portfolio.

D.5.8 CUMULATIVE IMPACTS

Staff has reviewed the lists of existing and foreseeable projects as presented in the Cumulative Scenario section of this SA/DEIS. Staff's review considers whether the interconnection of RSPP to SCE's transmission system along with other existing and foreseeable generation projects would conform to all LORS required for safe and reliable electric power transmission. The analysis described above under the heading Proposed Project – Scope of System Impact Studies is conducted in coordination with, and the approval of, California ISO to consider existing and proposed generator interconnections to the transmission grid and their potential safety and reliability impacts under a number of conservative contingency conditions.

The cumulative marginal impacts to the safe and reliable operation of the transmission system due to the RSPP project, as identified in the Phase II Study, would be mitigated with the Energy Commission's and BLM's incorporation of the mitigation measures and CoC's set forth in this section.

D.5.9 COMPLIANCE WITH LORS

The proposed interconnection facilities including the RSPP 230 kV switchyard, 230 kV overhead tie line to the new SCE Millennium 230 kV substation, and its termination at the new 230 kV substation are adequate in accordance with industry standards and good utility practices, and are acceptable to staff according to engineering LORS.

The Phase I Study results were found very speculative and inaccurate due to inclusion of 12,305 MW cluster generation projects including the RSPP. The Phase II Study will be performed with 2,065 MW active cluster generation projects including the RSPP.

Consequently after execution of the LGIA with applicant, the California ISO/SCE would proceed through the California Utility Commission's Certificate of Public Convenience and Necessity (CPCN) permit process for construction of facilities, which would include necessary CEQA analysis.

Because the Phase 1 Study does not provide a meaningful analysis of the reliability impacts of interconnecting the RSPP, staff is unable to determine whether or not the project will comply with reliability LORS.

D.5.9.1 TRANSMISSION SYSTEM ENGINEERING LORS

- California Public Utilities Commission (CPUC) General Order 95 (GO-95), “Rules for Overhead Electric Line Construction,” formulates uniform requirements for construction of overhead lines. Compliance with this order ensures adequate service and safety to persons engaged in the construction, maintenance and operation or use of overhead electric lines and to the public in general.
- California Public Utilities Commission (CPUC) General Order 128 (GO-128), “Rules for Construction of Underground Electric Supply and Communications Systems,” formulates uniform requirements and minimum standards to be used for underground supply systems to ensure adequate service and safety to persons engaged in the construction, maintenance and operation or use of underground electric lines and to the public in general.
- The National Electric Safety Code, 1999 provides electrical, mechanical, civil and structural requirements for overhead electric line construction and operation.
- NERC/WECC Planning Standards: The Western Electricity Coordinating Council (WECC) Planning Standards are merged with the North American Electric Reliability Council (NERC) Planning Standards and provide the system performance standards used in assessing the reliability of the interconnected system. These standards require the continuity of service to loads as the first priority and preservation of interconnected operation as a secondary priority. Certain aspects of the NERC/WECC standards are either more stringent or more specific than the NERC standards alone. These standards provide planning for electric systems so as to withstand the more probable forced and maintenance outage system contingencies at projected customer demand and anticipated electricity transfer levels, while continuing to operate reliably within equipment and electric system thermal, voltage and stability limits. These standards include the reliability criteria for system adequacy and security, system modeling data requirements, system protection and control, and system restoration. Analysis of the WECC system is based to a large degree on Section I.A of the standards, “NERC and WECC Planning Standards with Table I and WECC Disturbance-Performance Table” and on Section I.D, “NERC and WECC Standards for Voltage Support and Reactive Power”. These standards require that the results of power flow and stability simulations verify defined performance levels. Performance levels are defined by specifying the allowable variations in thermal loading, voltage and frequency, and loss of load that may occur on systems during various disturbances. Performance levels range from no significant adverse effects inside and outside a system area during a minor disturbance (loss of load or a single transmission element out of service) to a level that seeks to prevent system cascading and the subsequent blackout of islanded areas during a major disturbance (such as loss of multiple 500 kV lines along a common right of way, and/or multiple generators). While controlled loss of generation or load or system separation is permitted in certain circumstances, their uncontrolled loss is not permitted (WECC 2006).

- North American Reliability Council (NERC) Reliability Standards for the Bulk Electric Systems of North America provide national policies, standards, principles and guidelines to assure the adequacy and security of the electric transmission system. The NERC Reliability Standards provide for system performance levels under normal and contingency conditions. With regard to power flow and stability simulations, while these Reliability Standards are similar to NERC/WECC Standards, certain aspects of the NERC/WECC Standards are either more stringent or more specific than the NERC Standards for Transmission System Contingency Performance. The NERC Reliability Standards apply not only to interconnected system operation but also to individual service areas (NERC 2006).
- California ISO Planning Standards also provide standards, and guidelines to assure the adequacy, security and reliability in the planning of the California ISO transmission grid facilities. The California ISO Grid Planning Standards incorporate the NERC/WECC and NERC Reliability Planning Standards. With regard to power flow and stability simulations, these Planning Standards are similar to the NERC/WECC or NERC Reliability Planning Standards for Transmission System Contingency Performance. However, the California ISO Standards also provide some additional requirements that are not found in the WECC/NERC or NERC Standards. The California ISO Standards apply to all participating transmission owners interconnecting to the California ISO controlled grid. They also apply when there are any impacts to the California ISO grid due to facilities interconnecting to adjacent controlled grids not operated by the California ISO (California ISO 2002a).
- California ISO/FERC Electric Tariff provides guidelines for construction of all transmission additions/upgrades (projects) within the California ISO controlled grid. The California ISO determines the “Need” for the proposed project where it will promote economic efficiency or maintain system reliability. The California ISO also determines the Cost Responsibility of the proposed project and provides an Operational Review of all facilities that are to be connected to the California ISO grid (California ISO 2007a)..

D.5.10 PROPOSED CONDITIONS OF CERTIFICATIONS/MITIGATION MEASURES

TSE-1 The project owner shall furnish to the CPM and to the CBO a schedule of transmission facility design submittals, a Master Drawing List, a Master Specifications List, and a Major Equipment and Structure List. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide designated packages to the CPM when requested.

Verification: Prior to the start of construction, the project owner shall submit the schedule, a Master Drawing List, and a Master Specifications List to the CBO and to the CPM. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment (see a list of major equipment in **Table 1: Major Equipment List** below). Additions and

deletions shall be made to the table only with CPM and CBO approval. The project owner shall provide schedule updates in the Monthly Compliance Report.

**Transmission System Engineering Table 1
Major Equipment List**

Breakers
Step-up Transformer
Switchyard
Busses
Surge Arrestors
Disconnects and Wave-traps
Take off facilities
Electrical Control Building
Switchyard Control Building
Transmission Pole/Tower
Insulators and Conductors
Grounding System

TSE-2 Prior to the start of construction the project owner shall assign an electrical engineer and at least one of each of the following to the project:

- A. A civil engineer;
- B. A geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering;
- C. A design engineer, who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; or
- D. A mechanical engineer.

(Business and Professions Code Sections 6704 et seq., require state registration to practice as a civil engineer or structural engineer in California.)

The tasks performed by the civil, mechanical, electrical or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (e.g., proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer. The civil, geotechnical or civil and design engineer assigned in conformance with Facility Design condition **GEN-5**, may be responsible for design and review of the TSE facilities.

The project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all engineers assigned to the project. If any one of the designated engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer. This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform with predicted conditions used as a basis for design of earthwork or foundations.

The electrical engineer shall:

1. Be responsible for the electrical design of the power plant switchyard, outlet and termination facilities; and
2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

Verification: Prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all the responsible engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

TSE-3 If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend corrective action (1998 CBC, Chapter 1, Section 108.4, Approval Required; Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector; Appendix Chapter 33, Section 3317.7, Notification of Noncompliance). The discrepancy documentation shall become a controlled document and shall be submitted to the CBO for review and approval and shall reference this condition of certification.

Verification: The project owner shall submit a copy of the CBO's approval or disapproval of any corrective action taken to resolve a discrepancy to the CPM within 15 days of receipt. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action required to obtain the CBO's approval.

TSE-4 For the power plant switchyard, outlet line and termination, the project owner shall not begin any increment of construction until plans for that increment have been approved by the CBO. These plans, together with design changes and design change notices, shall remain on the site for one year after completion of construction. The project owner shall request that the CBO

inspect the installation to ensure compliance with the requirements of applicable LORS. The following activities shall be reported in the Monthly Compliance Report:

- A. Receipt or delay of major electrical equipment;
- B. Testing or energization of major electrical equipment; and
- C. The number of electrical drawings approved, submitted for approval, and still to be submitted.

Verification: Prior to the start of each increment of construction, the project owner shall submit to the CBO for review and approval the final design plans, specifications and calculations for equipment and systems of the power plant switchyard, outlet line and termination, including a copy of the signed and stamped statement from the responsible electrical engineer attesting to compliance with the applicable LORS, and send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

TSE-5 The project owner shall ensure that the design, construction, and operation of the proposed transmission facilities will conform to all applicable LORS, and the requirements listed below. The project owner shall submit the required number of copies of the design drawings and calculations, as determined by the CBO. Once approved, the project owner shall inform the CPM and CBO of any anticipated changes to the design, and shall submit a detailed description of the proposed change and complete engineering, environmental, and economic rationale for the change to the CPM and CBO for review and approval.

- A. The power plant outlet line shall meet or exceed the electrical, mechanical, civil, and structural requirements of CPUC General Order 95 or National Electric Safety Code (NESC); Title 8 of the California Code and Regulations (Title 8); Articles 35, 36 and 37 of the *High Voltage Electric Safety Orders*, California ISO standards, National Electric Code (NEC) and related industry standards.
- B. Breakers and busses in the power plant switchyard and other switchyards, where applicable, shall be sized to comply with a short-circuit analysis.
- C. Outlet line crossings and line parallels with transmission and distribution facilities shall be coordinated with the transmission line owner and comply with the owner's standards.
- D. The project conductors shall be sized to accommodate the full output of the project.
- E. Termination facilities shall comply with applicable SCE interconnection standards.
- F. The project owner shall provide to the CPM:
 - i) The Special Protection System (SPS) sequencing and timing if applicable,

- ii) A letter stating that the mitigation measures or projects selected by the transmission owners for each reliability criteria violation, for which the project is responsible, are acceptable,
- iii) The final Phase II Interconnection Study, including a description of facility upgrades, operational mitigation measures, and/or special protection system sequencing and timing if applicable; and
- iv) A copy of the executed LGIA signed by the California ISO and the project owner.

Verification: Prior to the start of construction or start of modification of transmission facilities, the project owner shall submit to the CBO for approval:

- A. Design drawings, specifications, and calculations conforming with CPUC General Order 95 or National Electric Safety Code (NESC); Title 8 of the California Code and Regulations (Title 8); Articles 35, 36 and 37 of the *High Voltage Electric Safety Orders*, CA ISO standards, National Electric Code (NEC) and related industry standards, for the poles/towers, foundations, anchor bolts, conductors, grounding systems, and major switchyard equipment;
- B. For each element of the transmission facilities identified above, the submittal package to the CBO shall contain the design criteria, a discussion of the calculation method(s), a sample calculation based on “worst case conditions”¹ and a statement signed and sealed by the registered engineer in responsible charge, or other acceptable alternative verification, that the transmission element(s) will conform with CPUC General Order 95 or National Electric Safety Code (NESC); Title 8 of the California Code and Regulations (Title 8); Articles 35, 36 and 37 of the *High Voltage Electric Safety Orders*, California ISO standards, National Electric Code (NEC), and related industry standards;
- C. Electrical one-line diagrams signed and sealed by the registered professional electrical engineer in charge, a route map, and an engineering description of the equipment and configurations covered by requirements **TSE-5** a) through g);
- D. The Special Protection System (SPS) sequencing and timing if applicable shall be provided concurrently to the CPM.
- E. A letter stating that the mitigation measures or projects selected by the transmission owners for each reliability criteria violation, for which the project is responsible, are acceptable,
- F. The final Phase II Interconnection Study, including a description of facility upgrades, operational mitigation measures, and/or special protection system sequencing and timing if applicable, and
- G. A copy of the executed LGIA signed by the California ISO and the project owner.

¹ Worst-case conditions for the foundations would include for instance, a dead-end or angle pole.

Prior to the start of construction of or modification of transmission facilities, the project owner shall inform the CBO and the CPM of any anticipated changes to the design that are different from the design previously submitted and approved and shall submit a detailed description of the proposed change and complete engineering, environmental, and economic rationale for the change to the CPM and CBO for review and approval.

TSE-6 The project owner shall provide the following Notice to the California Independent System Operator (California ISO) prior to synchronizing the facility with the California Transmission system:

1. At least one week prior to synchronizing the facility with the grid for testing, provide the California ISO a letter stating the proposed date of synchronization; and
2. At least one business day prior to synchronizing the facility with the grid for testing, provide telephone notification to the California ISO Outage Coordination Department.

Verification: The project owner shall provide copies of the California ISO letter to the CPM when it is sent to the California ISO one week prior to initial synchronization with the grid. The project owner shall contact the California ISO Outage Coordination Department, Monday through Friday, between the hours of 0700 and 1530 at (916) 351-2300 at least one business day prior to synchronizing the facility with the grid for testing. A report of conversation with the California ISO shall be provided electronically to the CPM one day before synchronizing the facility with the California transmission system for the first time.

TSE-7 The project owner shall be responsible for the inspection of the transmission facilities during and after project construction, and any subsequent CPM and CBO approved changes thereto, to ensure conformance with CPUC GO-95 or NESC, Title 8, CCR, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders", applicable interconnection standards, NEC and related industry standards. In case of non-conformance, the project owner shall inform the CPM and CBO in writing, within 10 days of discovering such non-conformance and describe the corrective actions to be taken.

Verification: Within 60 days after first synchronization of the project, the project owner shall transmit to the CPM and CBO:

- A. "As built" engineering description(s) and one-line drawings of the electrical portion of the facilities signed and sealed by the registered electrical engineer in responsible charge. A statement attesting to conformance with CPUC GO-95 or NESC, Title 8, California Code of Regulations, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders", and applicable interconnection standards, NEC, related industry standards, and these conditions shall be provided concurrently.
- B. An "as built" engineering description of the mechanical, structural, and civil portion of the transmission facilities signed and sealed by the registered engineer in responsible charge or acceptable alternative verification. "As built" drawings of the

electrical, mechanical, structural, and civil portion of the transmission facilities shall be maintained at the power plant and made available, if requested, for CPM audit as set forth in the "Compliance Monitoring Plan".

- C. A summary of inspections of the completed transmission facilities, and identification of any nonconforming work and corrective actions taken, signed and sealed by the registered engineer in charge.

D.5.11 CONCLUSIONS

1. The proposed interconnection facilities including the RSPP 230 kV switchyard, generator 230 kV overhead tie line to the new SCE Millennium 230 kV substation, and its termination at the new 230 kV substation are adequate in accordance with industry standards and good utility practices, and are acceptable to staff according to engineering LORS.
2. The Phase I Study results were not found to provide a meaningful analysis of the RSPP due to the inclusion of 12,305 MW cluster generation projects including the RSPP, which resulted in a significant number of reliability impacts and downstream major transmission. The Phase II Study will be performed with the 2,065 MW remaining cluster generation projects including RSPP. The Phase II study will provide an accurate identification of system impacts and a mitigation plan with downstream transmission upgrades. Consequently after completion of the Phase II Study and execution of the LGIA with applicant, the California ISO/SCE would proceed through the California Utility Commission's CPCN permit process for construction of facilities, which would include necessary CEQA analysis.
3. Because the Phase 1 Study does not provide a meaningful analysis of the reliability impacts of interconnecting the RSPP, staff is unable to determine whether or not the project will comply with reliability LORS.
4. The RSPP, as local solar generation, would provide clean renewable energy towards meeting state mandate and goals.

D.5.12 REFERENCES

California ISO (California Independent System Operator) 1998a. California ISO Tariff Scheduling Protocol posted April 1998, Amendments 1,4,5,6, and 7 incorporated.

California ISO (California Independent System Operator) 1998b. California ISO Dispatch Protocol posted April 1998.

California ISO (California Independent System Operator) 2002a. California ISO Planning Standards, February 7, 2002.

California ISO (California Independent System Operator) 2007a. California ISO, FERC Electric Tariff, First Replacement Vol. No. 1, March, 2007.

California ISO (California Independent System Operator) 2009a, Appendix Y - Large Generator Interconnection Procedures (LGIP) for Interconnection Requests in a Queue Cluster Window, <http://www.caiso.com/2471/247199c130150.pdf>.

SM 2009a - Solar Millenium LLC/J. Eichhammer (tn 53100). AFC for Ridgecrest Solar Power Project, dated 8/31/2009. Submitted to CEC/Docket Unit on 9/1/2009.

SM 2009c - Solar Millennium/ N. Tenenbaum 53251 Letter Regarding Confidential Cluster Phase I Interconnection Study 9/16/2009 Submitted to CEC/Docket Unit 9/16/2009.

SM 2009d - Solar Milenium 54005 Application for Certification Volume 3 Supplement 10/26/2009 Submitted to CEC/Docket Unit 10/30/2009.

SM 2010a - Solar Millennium/ A. Harron 55004 Applicant's Responses to CEC Data Request Set 1 & 2 with Bio Files 1/25/2010 Submitted to CEC/Docket Unit 1/25/2010.

NERC (North American Electric Reliability Council) 2006. Reliability Standards for the Bulk Electric Systems of North America, May 2 2006.

WECC (Western Electricity Coordinating Council) 2006. NERC/WECC Planning Standards, August 2006.

D.5.13 DEFINITION OF TERMS

ACSR	Aluminum cable steel reinforced.
AAC	All Aluminum conductor.
ACSS	Aluminum conductor steel-supported.
Ampacity	Current-carrying capacity, expressed in amperes, of a conductor at specified ambient conditions, at which damage to the conductor is nonexistent or deemed acceptable based on economic, safety, and reliability considerations.
Ampere	The unit of current flowing in a conductor.
Kiloampere (kA)	1,000 Amperes
Bundled	Two wires, 18 inches apart.
Bus	Conductors that serve as a common connection for two or more circuits.
Conductor	The part of the transmission line (the wire) that carries the current.

Congestion Management	Congestion management is a scheduling protocol, which provides that dispatched generation and transmission loading (imports) would not violate criteria.
Emergency Overload	See Single Contingency. This is also called an L-1.
Hertz	The unit for System Frequency.
Kcmil or KCM	Thousand circular mil. A unit of the conductor's cross sectional area, when divided by 1,273, the area in square inches is obtained.
Kilovolt (kV)	A unit of potential difference, or voltage, between two conductors of a circuit, or between a conductor and the ground. 1,000 Volts.
Loop	An electrical cul de sac. A transmission configuration that interrupts an existing circuit, diverts it to another connection and returns it back to the interrupted circuit, thus forming a loop or cul de sac.
MVAR or Megavars	Megavolt Ampere-Reactive. One million Volt-Ampere-Reactive. Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system.
Megavolt Ampere (MVA)	A unit of apparent power, equals the product of the line voltage in kilovolts, current in amperes, the square root of 3, and divided by 1000.
Megawatt (MW)	A unit of power equivalent to 1,341 horsepower.
Normal Operation/ Normal Overload	When all customers receive the power they are entitled to without interruption and at steady voltage, and no element of the transmission system is loaded beyond its continuous rating.
N-1 Condition	See Single Contingency.
Outlet	Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation facilities to the main grid.
Power Flow Analysis	A power flow analysis is a forward looking computer simulation of essentially all generation and transmission system facilities that identifies overloaded circuits, transformers and other equipment and system voltage levels.

Reactive Power	Reactive power is generally associated with the reactive nature of inductive loads like motor loads that must be fed by generation units in the system. An adequate supply of reactive power is required to maintain voltage levels in the system.
Remedial Action Scheme (RAS)	A remedial action scheme is an automatic control provision, which, for instance, would trip a selected generating unit upon a circuit overload.
SSAC	Steel Supported Aluminum Conductor.
SF6	Sulfur hexafluoride is an insulating medium.
Single Contingency	Also known as emergency or N-1 condition, occurs when one major transmission element (circuit, transformer, circuit breaker, etc.) or one generator is out of service.
Solid Dielectric Cable	Copper or aluminum conductors that are insulated by solid polyethylene type insulation and covered by a metallic shield and outer polyethylene jacket.
SVC	Static VAR Compensator: An equipment made of Capacitors and Reactors with electronic controls for producing and controlling Reactive Power in the Power System.
Switchyard	A power plant switchyard (switchyard) is an integral part of a power plant and is used as an outlet for one or more electric generators.
Thermal rating	See ampacity.
TSE	Transmission System Engineering.
TRV	Transient Recovery Voltage
Tap	A transmission configuration creating an interconnection through a sort single circuit to a small or medium sized load or a generator. The new single circuit line is inserted into an existing circuit by utilizing breakers at existing terminals of the circuit, rather than installing breakers at the interconnection in a new switchyard.
Undercrossing	A transmission configuration where a transmission line crosses below the conductors of another transmission line, generally at 90 degrees.

Underbuild

A transmission or distribution configuration where a transmission or distribution circuit is attached to a transmission tower or pole below (under) the principle transmission line conductors.

VAR

Voltage Ampere Reactive, a measure for Reactive power in the power system.

E GENERAL CONDITIONS INCLUDING COMPLIANCE MONITORING AND CLOSURE PLAN

Testimony of Dale Rundquist

E.1 INTRODUCTION

The project's General Compliance Conditions of Certification, including the Compliance Monitoring and Closure Plan (Compliance Plan) have been established as required by Public Resources Code Section 25532. The plan provides a means for assuring that the facility is constructed, operated, and closed in compliance with public health and safety, environmental and other applicable regulations, guidelines, and conditions adopted or established by the California Energy Commission and specified in the written decision on the Application for Certification or otherwise required by law. The Compliance Plan will be integrated with a U.S. Bureau of Land Management (BLM) Compliance Monitoring Plan (hereafter referred to as the Compliance Plan) to assure compliance with the terms and conditions of any approved Right-of-Way (ROW) grant including the approved Plan of Development (POD).

The Compliance Plan is composed of elements that:

- Set forth the duties and responsibilities of BLM's Authorized Officer, the Compliance Project Manager (CPM), the project owner/lease holder, delegate agencies, and others;
- Set forth the requirements for handling confidential records and maintaining the compliance record;
- State procedures for settling disputes and making post-certification changes;
- State procedures for requesting and approving ROW Grant or POD changes;
- State the requirements for periodic compliance reports and other administrative procedures that are necessary to verify the compliance status for all BLM and Energy Commission approved conditions of certification/mitigation measures;
- Establish requirements for modifications or amendments to facility closure, revegetation, and restoration plans; and
- Specify conditions of certification for each technical area containing the measures required to mitigate any and all potential adverse project impacts associated with construction, operation and closure. Each specific condition of certification also includes a verification provision that describes the method of assuring that the condition has been satisfied.

Conditions of Certification referred to herein serve the purpose of both the Energy Commission's Conditions of Certification for purposes of the California Environmental Quality Act (CEQA) and BLM's Mitigation Measures for purposes of the National Environmental Policy Act (NEPA).

E.2 DEFINITIONS

The following terms and definitions are used to establish when conditions of certification are implemented.

BLM AUTHORIZED OFFICER:

The BLM Authorized Officer for the Project is the BLM Ridgecrest Field Manager or his designated Compliance Inspector that is responsible for oversight and inspection of all construction and operational related activities on public land.

PRE-CONSTRUCTION SITE MOBILIZATION

Preconstruction activities allowed during site mobilization are limited to the installation of fencing, construction trailers, construction trailer utilities, and construction trailer parking at the site. Limited ground disturbance, grading, and trenching associated with the above mentioned pre-construction activities are considered part of site mobilization. Walking, driving or parking a passenger vehicle, pickup truck and/or light vehicle is allowable during site mobilization.

CONSTRUCTION

Onsite work to install permanent equipment or structures for any facility.

GROUND DISTURBANCE

Any ground disturbing activities that result in the removal or disturbance of top soil or vegetation.

GRADING, BORING, AND TRENCHING

Construction-related grading, boring, and trenching refers to activities that result in subsurface soil work at the site and for access roads and linear facilities, e.g., alteration of the topographical features such as leveling, removal of hills or high spots, moving of soil from one area to another, and/or removal of soil.

Notwithstanding the definitions of ground disturbance, grading, boring, and trenching above, construction does not include the following:

1. The installation of environmental monitoring equipment;
2. A soil or geological investigation;
3. A topographical survey;
4. Any other study or investigation to determine the environmental acceptability or feasibility of the use of the site for any particular facility; and
5. Any work to provide access to the site for any of the purposes specified in "Construction" 1, 2, 3, or 4 above except for the grading of roads to access the site.

START OF COMMERCIAL OPERATION

For compliance monitoring purposes, “commercial operation” begins after the completion of start-up and commissioning, and when the power plant has reached reliable steady-state production of electricity at the rated capacity. At the start of commercial operation, plant control is usually transferred from the construction manager to the plant operations manager.

E.3 BLM’S AUTHORIZED OFFICER AND COMPLIANCE PROJECT MANAGER RESPONSIBILITIES

BLM’s Authorized Officer (AO) or Compliance Inspector and the CEC’s Compliance Project Manager (CPM) shall oversee the compliance monitoring and are responsible for:

1. Ensuring that the design, construction, operation, and closure of the project facilities are in compliance with the terms and conditions of BLM’s ROW Grant and the Energy Commission Decision;
2. Resolving complaints;
3. Processing post-certification changes to the conditions of certification, project description (petition to amend), and ownership or operational control (petition for change of ownership) (See **COMPLIANCE-14** instructions for filing petitions);
4. Documenting and tracking compliance filings, and;
5. Ensuring that compliance files are maintained and accessible.

BLM’s AO is the main contact person for all construction BLM lands and will consult with appropriate responsible agencies and Energy Commission staff when handling disputes, complaints, and amendments. The CPM is the contact person for the Energy Commission and will assist the BLM with disputes, complaints, and amendments.

All project compliance submittals are submitted to BLM’s AO for processing. Where a submittal required by a condition of certification requires BLM’s AO and/or CPM approval, the approval will involve all appropriate BLM personnel, Energy Commission staff and management. All submittals must include searchable electronic versions (pdf or word files).

E.4 CHIEF BUILDING OFFICIAL RESPONSIBILITIES

The Chief Building Official (CBO) shall serve as BLM’s and the Energy Commission’s delegate to assure the project is designed and constructed in accordance with BLM’s Right-of-Way Grant, the Energy Commission’s Decision including Conditions of Certification, the California Building Standards Code, local building codes and

applicable laws, ordinances, regulations and standards to ensure health and safety. The CBO is typically made-up of a team of specialists covering civil, structural, mechanical, and electrical disciplines whose duties include the following:

1. Performing design review and plan checks of all drawings, specifications and procedures;
2. Conducting construction inspection;
3. Functioning as BLM's and the Energy Commission's delegate including reporting noncompliance issues or violations to the BLM Authorized Officer for action and taking any action, including issuing a Stop Work Order, to ensure compliance;
4. Exercising access as needed to all project owner/lease holder construction records, construction, and inspection procedures, test equipment and test results; and
5. Providing weekly reports on the status of construction to BLM's Authorized Officer and the CPM.
6. All construction documents shall be approved by the BLM's Authorized Office prior to any construction activity.

PRE-CONSTRUCTION AND PRE-OPERATION COMPLIANCE MEETING

BLM's AO and the CPM shall schedule pre-construction and pre-operation compliance meetings prior to the projected start-dates of construction, plant operation, or both. The purpose of these meetings is to assemble the technical staff of the BLM, the Energy Commission, the project owner/lease holder, and the construction contractor to review the status of all pre-construction or pre-operation requirements contained in BLM's and the Energy Commission's conditions of certification in order to confirm that all applicable conditions of certification have been met, or if they have not been met, to ensure that the proper action is taken. In addition, these meetings ensure, to the extent possible, that BLM and Energy Commission conditions will not delay the construction and operation of the plant due to oversight and to preclude any last minute, unforeseen issues from arising. Pre-construction meetings held during the certification process must be publicly noticed unless they are confined to administrative issues and processes.

BLM AND ENERGY COMMISSION RECORD

BLM and the Energy Commission shall maintain the following documents and information as a public record, in either the Energy Commission's Compliance file or Dockets file, for the life of the project (or other period as required):

- All documents demonstrating compliance with any legal requirements relating to the construction and operation of the facility;
- All monthly and annual compliance reports filed by the project owner/lease holder;
- All complaints of noncompliance filed with BLM and the Energy Commission; and
- All petitions/requests for project or condition of certification changes and the resulting BLM, Energy Commission staff or Energy Commission action.

E.5 PROJECT OWNER/LEASE HOLDER RESPONSIBILITIES

The project owner/lease holder is responsible for ensuring that the compliance conditions of certification and all other conditions of certification that appear in BLM's ROW Grant and the Energy Commission Decision are satisfied. The compliance conditions regarding post-certification changes specify measures that the project owner/lease holder must take when requesting changes in the project design, conditions of certification, or ownership. Failure to comply with any of the conditions of certification or compliance conditions may result in the reopening of the case and a revocation of the Energy Commission certification; an administrative fine; or other action as appropriate. A summary of the Compliance Conditions of Certification is included as Compliance Table 1 at the conclusion of this section. The BLM ROW grant holder will comply with the terms, conditions, and special stipulations of the ROW grant. Failure to comply with applicable laws or regulations or any of the terms and conditions of a BLM ROW grant may result in the suspension or termination of the ROW grant (43 CFR 2807.17). Prior to suspending or terminating an ROW grant, BLM will provide written notice to the holder stating it intends to suspend or terminate and will provide reasonable opportunity to correct any noncompliance.

E.6 COMPLIANCE MITIGATION MEASURES/CONDITIONS OF CERTIFICATION

UNRESTRICTED ACCESS (COMPLIANCE-1)

BLM's AO, responsible BLM staff, the CPM, responsible Energy Commission staff, and delegated agencies or consultants shall be guaranteed and granted unrestricted access to the power plant site, related facilities, project-related staff, and the records maintained on-site for the purpose of conducting audits, surveys, inspections, or general site visits. Although BLM's AO and the CPM will normally schedule site visits on dates and times agreeable to the project owner/lease holder, BLM's AO and the CPM reserve the right to make unannounced visits at any time.

COMPLIANCE RECORD (COMPLIANCE-2)

The project owner/lease holder shall maintain project files on-site or at an alternative site approved by BLM's AO and the CPM for the life of the project, unless a lesser period of time is specified by the conditions of certification. The files shall contain copies of all "as-built" drawings, documents submitted as verification for conditions, and other project-related documents. As-built drawings of all facilities including linear facilities shall be provided to the BLM AO for inclusion in the BLM administrative record, and to the Energy Commission CBO, within 90-days of completion of that portion of the facility or project.

BLM and Energy Commission staff and delegate agencies shall, upon request to the project owner/lease holder, be given unrestricted access to the files maintained pursuant to this condition.

COMPLIANCE VERIFICATION SUBMITTALS (COMPLIANCE-3)

Each condition of certification is followed by a means of verification. The verification describes the Energy Commission's procedure(s) to ensure post-certification compliance with adopted conditions. The verification procedures, unlike the conditions, may be modified as necessary by BLM's AO and the CPM. (See **COMPLIANCE-14** for requirements to modify conditions of certification.)

Verification of compliance with the conditions of certification can be accomplished by the following:

1. Monthly and/or annual compliance reports filed by the project owner/lease holder or authorized agent, reporting on work done and providing pertinent documentation, as required by the specific conditions of certification;
2. Appropriate letters from delegate agencies verifying compliance;
3. BLM and Energy Commission staff audits of project records; and/or
4. BLM and Energy Commission staff inspections of work, or other evidence that the requirements are satisfied.

Verification lead times associated with start of construction may require the project owner to file submittals during the certification process, particularly if construction is planned to commence shortly after certification.

A cover letter from the project owner/lease holder or authorized agent is required for all compliance submittals and correspondence pertaining to compliance matters. The cover letter subject line shall identify the project by AFC number, the appropriate condition(s) of certification by condition number(s), and a brief description of the subject of the submittal. The project owner/lease holder shall also identify those submittals not required by a condition of certification with a statement such as: "This submittal is for information only and is not required by a specific condition of certification." When submitting supplementary or corrected information, the project owner/lease holder shall reference the date of the previous submittal and BLM/Energy Commission condition number.

The project owner/lease holder is responsible for the delivery and content of all verification submittals to the BLM's AO and CPM, whether such condition was satisfied by work performed by the project owner/lease holder or an agent of the project owner/lease holder.

All hardcopy submittals shall be addressed to each of the following:

BLM's Authorized Officer
(CACA-xxxxx, xxxxx, xxxxx, and xxxxx)
U.S. Bureau of Land Management
ADDRESS
CITY, STATE ZIP

Dale Rundquist, CPM
(09-AFC-9C)
California Energy Commission
1516 Ninth Street, MS-2000
Sacramento, CA 95814

Those submittals shall be accompanied by a searchable electronic copy, on a CD, or by e-mail, as agreed upon by BLM's AO and the CPM.

If the project owner/lease holder desires BLM and/or Energy Commission staff action by a specific date, that request shall be made in the submittal cover letter and shall include a detailed explanation of the effects on the project if that date is not met.

PRE-CONSTRUCTION MATRIX AND TASKS PRIOR TO START OF CONSTRUCTION (COMPLIANCE-4)

Prior to commencing construction, a compliance matrix addressing only those conditions that must be fulfilled before the start of construction shall be submitted by the project owner/lease holder to BLM's AO and the CPM. This matrix will be included with the project owner/lease holder's first compliance submittal or prior to the first pre-construction meeting, whichever comes first. It will be submitted in the same format as the compliance matrix described below. In order to begin any on-site mobilization or surface disturbing activities on public land, the BLM AO must approve a written Notice to Proceed (NTP). NTPs will be phased as appropriate to facilitate timely implementation of construction.

Construction shall not commence until the pre-construction matrix is submitted, all pre-construction conditions have been complied with, and BLM's AO and the CPM have issued a letter and BLM has issued an NTP to the project owner/lease holder authorizing construction. Various lead times for submittal of compliance verification documents to BLM's AO and the CPM for conditions of certification are established to allow sufficient BLM and Energy Commission staff time to review and comment and, if necessary, allow the project owner/lease holder to revise the submittal in a timely manner. This will ensure that project construction may proceed according to schedule.

Failure to submit compliance documents within the specified lead-time may result in delays in authorization to commence various stages of project development.

If the project owner/lease holder anticipates commencing project construction as soon as the project is certified, it may be necessary for the project owner/lease holder to file compliance submittals prior to project certification. Compliance submittals should be completed in advance where the necessary lead time for a required compliance event extends beyond the date anticipated for start of construction. The project owner/lease holder must understand that the submittal of compliance documents prior to project certification is at the owner/lease holder's own risk, pending project approval. Any submittal approved by Energy Commission staff is subject to change, based upon BLM's ROW Grant and the Energy Commission Decision.

Compliance Reporting

There are two different compliance reports that the project owner/lease holder must submit to assist BLM's AO and the CPM in tracking activities and monitoring compliance with the terms and conditions of BLM's ROW Grant and the Energy Commission Decision. During construction, the project owner/lease holder or authorized agent will submit monthly compliance reports. During operation, an annual compliance report must be submitted. These reports, and the requirement for an accompanying

compliance matrix, are described below. The majority of the conditions of certification require that compliance submittals be submitted to BLM's AO and the CPM in the monthly or annual compliance reports.

POSTING OF A SURETY BOND (COMPLIANCE-5)

Prior to site disturbance and each increment of construction, the project owner/lease holder shall post a surety bond adequate to cover the cost of decommissioning and restoration, including the removal of the project features that have been constructed for that portion of the site and restoring the native topography and vegetation. An "increment of construction" shall mean a significant feature of construction, such as site grading, a building, a fluid storage tank, a water treatment facility, a hydrogen production facility, a switchyard, or a group of solar collectors connected to an electrical transformer (including that transformer). This surety bond will apply to all site disturbance features.

The project owner/lease holder shall provide the surety bond to the BLM AO for approval and to the CPM for review with written evidence indicating that the surety bond is adequate to cover the cost of decommissioning and removing the project features constructed, allowing for site restoration. The written evidence shall include a valid estimate showing that the amount of the bond is adequate to accomplish such work. The timing for the submittal of the surety bond and approval of this document shall be coordinated with the BLM AO and CPM. Over the life of the project, the surety bond will be updated as necessary to account for any changes to the project description and/or decommissioning costs.

COMPLIANCE MATRIX (COMPLIANCE-6)

A compliance matrix shall be submitted by the project owner/lease holder to BLM's AO and the CPM along with each monthly and annual compliance report. The compliance matrix is intended to provide BLM's AO and the CPM with the current status of all conditions of certification in a spreadsheet format. The compliance matrix must identify:

1. The technical area;
2. The condition number;
3. A brief description of the verification action or submittal required by the condition;
4. The date the submittal is required (e.g., 60 days prior to construction, after final inspection, etc.);
5. The expected or actual submittal date;
6. The date a submittal or action was approved by the Chief Building Official (CBO), BLM's AO, CPM, or delegate agency, if applicable;
7. The compliance status of each condition, e.g., "not started," "in progress" or "completed" (include the date); and

8. If the condition was amended, the date of the amendment.

Satisfied conditions shall be placed at the end of the matrix.

MONTHLY COMPLIANCE REPORT (COMPLIANCE-7)

The first monthly compliance report is due one month following the Energy Commission business meeting date upon which the project was approved, unless otherwise agreed to by BLM's AO and the CPM. The first monthly compliance report shall include the AFC number and an initial list of dates for each of the events identified on the Key Events List. The Key Events List Form is found at the end of this section.

During pre-construction and construction of each power plant, the project owner/lease holder or authorized agent shall submit an original and an electronic searchable version of the monthly compliance report within 10 working days after the end of each reporting month or other period of time agreed to by BLM's AO and the CPM. Monthly compliance reports shall clearly identify the reporting month. The reports shall contain, at a minimum:

1. A summary of the current project construction status, a revised/updated schedule if there are significant delays, and an explanation of any significant changes to the schedule;
2. Documents required by specific conditions to be submitted along with the monthly compliance report. Each of these items must be identified in the transmittal letter, as well as the conditions they satisfy and submitted as attachments to the monthly compliance report;
3. An initial, and thereafter updated, compliance matrix showing the status of all conditions of certification (fully satisfied conditions do not need to be included in the matrix after they have been reported as completed);
4. A list of conditions that have been satisfied during the reporting period, and a description or reference to the actions that satisfied the condition;
5. A list of any submittal deadlines that were missed, accompanied by an explanation and an estimate of when the information will be provided;
6. A cumulative listing of any approved changes to conditions of certification;
7. A listing of any filings submitted to, or permits issued by, other governmental agencies during the month;
8. A projection of project compliance activities scheduled during the next two months. The project owner/lease holder shall notify BLM's AO and the CPM as soon as any changes are made to the project construction schedule that would affect compliance with conditions of certification;
9. A listing of the month's additions to the on-site compliance file; and

10. A listing of complaints, notices of violation, official warnings, and citations received during the month, a description of the resolution of the resolved actions, and the status of any unresolved actions.

All sections, exhibits, or addendums shall be separated by tabbed dividers or as acceptable by BLM's AO and the CPM.

ANNUAL COMPLIANCE REPORT (COMPLIANCE-8)

After construction of each power plant is complete or when a power plant goes into commercial operations, the project owner/lease holder shall submit annual compliance reports instead of monthly compliance reports. The reports are for each year of commercial operation and are due to BLM's AO and the CPM each year at a date agreed to by BLM's AO and the CPM. Annual compliance reports shall be submitted over the life of the project unless otherwise specified by BLM's AO and the CPM. Each annual compliance report shall include the AFC number, identify the reporting period and shall contain the following:

1. An updated compliance matrix showing the status of all conditions of certification (fully satisfied conditions do not need to be included in the matrix after they have been reported as completed);
2. A summary of the current project operating status and an explanation of any significant changes to facility operations during the year;
3. Documents required by specific conditions to be submitted along with the annual compliance report. Each of these items must be identified in the transmittal letter, with the condition it satisfies, and submitted as attachments to the annual compliance report;
4. A cumulative listing of all post-certification changes by the Energy Commission or changes to the BLM ROW grant or approved POD by BLM , or cleared by BLM's AO and the CPM;
5. An explanation for any submittal deadlines that were missed, accompanied by an estimate of when the information will be provided;
6. A listing of filings submitted to, or permits issued by, other governmental agencies during the year;
7. A projection of project compliance activities scheduled during the next year;
8. A listing of the year's additions to the on-site compliance file;
9. An evaluation of the on-site contingency plan for unplanned facility closure, including any suggestions necessary for bringing the plan up to date [see Compliance Conditions for Facility Closure in section E.8]; and
10. A listing of complaints, notices of violation, official warnings, and citations received during the year, a description of the resolution of any resolved matters, and the status of any unresolved matters.

CONFIDENTIAL INFORMATION (COMPLIANCE-9)

Any information that the project owner/lease holder deems confidential shall be submitted to the Energy Commission's executive director with an application for confidentiality pursuant to Title 20, California Code of Regulations, Section 2505(a). Any information that is determined to be confidential shall be kept confidential as provided for in Title 20, California Code of Regulations, Section 2501 et. seq.

Any information the ROW holder deems confidential shall be submitted to the BLM AO with a written request for said confidentiality along with a justification for the request. All confidential submissions to BLM should be clearly stamped "proprietary information" by the holder when submitted.

ANNUAL ENERGY FACILITY COMPLIANCE FEE (COMPLIANCE-10)

Pursuant to the provisions of Section 25806(b) of the Public Resources Code, the project owner/lease holder is required to pay an annual compliance fee, which is adjusted annually. Current compliance fee information is available on the Energy Commission's website http://www.energy.ca.gov/siting/filing_fees.html. You may also contact the CPM for the current fee information. The initial payment is due on the date the Energy Commission adopts the final decision. All subsequent payments are due by July 1 of each year in which the facility retains its certification. The payment instrument shall be made payable to the California Energy Commission and mailed to: Accounting Office MS-02, California Energy Commission, 1516 9th St., Sacramento, CA 95814.

REPORTING OF COMPLAINTS, NOTICES, AND CITATIONS (COMPLIANCE-11)

Prior to the start of construction, the project owner/lease holder must send a letter to property owners living within one mile of the project notifying them of a telephone number to contact project representatives with questions, complaints, or concerns. If the telephone is not staffed 24 hours per day, it shall include automatic answering with date and time stamp recording. All recorded complaints shall be responded to within 24 hours. The telephone number shall be posted at the project site and made easily visible to passersby during construction and operation. The telephone number shall be provided to BLM's AO and the CPM who will post it on the Energy Commission's web page at:

http://www.energy.ca.gov/sitingcases/power_plants_contacts.html

Any changes to the telephone number shall be submitted immediately to BLM's AO and the CPM, who will update the web page.

In addition to the monthly and annual compliance reporting requirements described above, the project owner/lease holder shall report and provide copies to BLM's AO and the CPM of all complaint forms, including noise and lighting complaints, notices of violation, notices of fines, official warnings, and citations, within 10 days of receipt. Complaints shall be logged and numbered. Noise complaints shall be recorded on the form provided in the **NOISE** conditions of certification. All other complaints shall be recorded on the complaint form (Attachment 1).

E.7 FACILITY CLOSURE

At some point in the future, the project will cease operation and close down. At that time, it will be necessary to implement the Closure, Revegetation and Restoration Plan to ensure that the closure occurs in such a way that public health and safety and the environment are protected from adverse impacts. Although the project setting for this project does not appear, at this time, to present any special or unusual closure problems, it is impossible to foresee what the situation will be in 30 years or more when the project ceases operation. Therefore, provisions must be made that provide the flexibility to deal with the specific situation and project setting that exist at the time of closure. Laws, ordinances, regulations, and standards (LORS) pertaining to facility closure are identified in the sections dealing with each technical area. Facility closure will be consistent with LORS in effect at the time of closure. Closure would be conducted in accordance with Condition of Certification **BIO-14** that requires the project owner/lease holder to develop and implement a Closure, Revegetation and Rehabilitation Plan.

There are at least three circumstances in which a facility closure can take place: planned closure, unplanned temporary closure, and unplanned permanent closure.

CLOSURE DEFINITIONS

Planned Closure

A planned closure occurs when the facility is closed in an anticipated, orderly manner, at the end of its useful economic or mechanical life, or due to gradual obsolescence.

Unplanned Temporary Closure

An unplanned temporary closure occurs when the facility is closed suddenly and/or unexpectedly, on a short-term basis, due to unforeseen circumstances such as a natural disaster or an emergency. Short-term is defined as cessation of construction activities or operations of a power plant for a period less than 6-months long. Cessation of construction or operations for a period longer than 6 months is considered a permanent closure.

Unplanned Permanent Closure

An unplanned permanent closure occurs if the project owner/lease holder closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unplanned closure where the owner/lease holder implements the on-site contingency plan. It can also include unplanned closure where the project owner/lease holder fails to implement the contingency plan, and the project is essentially abandoned.

E.8 COMPLIANCE CONDITIONS FOR FACILITY CLOSURE

PLANNED CLOSURE (COMPLIANCE-11)

In order to ensure that a planned facility closure does not create adverse impacts, a closure process that provides for careful consideration of available options and

applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of closure will be undertaken. To ensure adequate review of a planned project closure, the project owner/lease holder shall submit a revision or update to the approved Closure, Revegetation and Rehabilitation Plan to BLM and the Energy Commission for review and approval at least 12 months (or other period of time agreed to by BLM's AO and the CPM) prior to commencement of closure activities. The project owner/lease holder shall file 50 copies and 50 CDs with the Energy Commission and 10 copies and 10 CDs with BLM (or other number of copies agreed upon by BLM's AO and the CPM) of a proposed facility closure plan/Closure, Revegetation and Rehabilitation Plan.

The plan shall:

1. Identify and discuss any impacts and mitigation to address significant adverse impacts associated with proposed closure activities and to address facilities, equipment, or other project related materials that must be removed from the site;
2. Identify a schedule of activities for closure of the power plant site, transmission line corridor, and all other appurtenant facilities constructed as part of the project;
3. Address conformance of the plan with all applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of facility closure, and applicable conditions of certification; and
4. Address any changes to the site revegetation, rehabilitation, monitoring and long-term maintenance specified in the existing plan that are needed for site revegetation and rehabilitation to be successful.

Prior to submittal of an amended or revised Closure, Revegetation and Restoration Plan, a meeting shall be held between the project owner/lease holder, BLM's AO and the Energy Commission CPM for the purpose of discussing the specific contents of the plan.

In the event that there are significant issues associated with the proposed facility Closure, Revegetation and Restoration plan's approval, or the desires of local officials or interested parties are inconsistent with the plan, BLM's AO the CPM shall hold one or more workshops and/or BLM and the Energy Commission may hold public hearings as part of its approval procedure.

As necessary, prior to or during the closure plan process, the project owner/lease holder shall take appropriate steps to eliminate any immediate threats to public health and safety and the environment, but shall not commence any other closure activities until BLM and the Energy Commission approve the facility Closure, Revegetation and Restoration plan.

UNPLANNED TEMPORARY CLOSURE/ON-SITE CONTINGENCY PLAN (COMPLIANCE-12)

In order to ensure that public health and safety and the environment are protected in the event of an unplanned temporary facility closure, it is essential to have an On-Site

Contingency Plan in place. The On-Site Contingency Plan will help to ensure that all necessary steps to mitigate public health and safety impacts and environmental impacts are taken in a timely manner.

The project owner/lease holder shall submit an On-Site Contingency Plan for BLM's AO and CPM review and approval. The plan shall be submitted no less than 60 days (or other time agreed to by BLM's AO and the CPM) after approval of any NTP or letter granting approval to commence construction for each phase of construction. A copy of the approved plan must be in place during commercial operation of the facility and shall be kept at the site at all times.

The project owner/lease holder, in consultation with BLM's AO and the CPM, will update the On-Site Contingency Plan as necessary. BLM's AO and the CPM may require revisions to the On-Site Contingency Plan over the life of the project. In the annual compliance reports submitted to the Energy Commission, the project owner/lease holder will review the On-Site Contingency Plan and recommend changes to bring the plan up to date. Any changes to the plan must be approved by BLM's AO and the CPM.

The On-Site Contingency Plan shall provide for taking immediate steps to secure the facility from trespassing or encroachment. In addition, for closures of more than 90 days, unless other arrangements are agreed to by BLM's AO and the CPM, the plan shall provide for removal of hazardous materials and hazardous wastes, draining of all chemicals from storage tanks and other equipment, and the safe shutdown of all equipment. (Also see specific conditions of certification for the technical areas of Hazardous Materials Management and Waste Management.)

In addition, consistent with requirements under unplanned permanent closure addressed below, the nature and extent of insurance coverage, and major equipment warranties must also be included in the On-Site Contingency Plan. In addition, the status of the insurance coverage and major equipment warranties must be updated in the annual compliance reports.

In the event of an unplanned temporary closure, the project owner/lease holder shall notify BLM's AO and the CPM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the On-Site Contingency Plan. The project owner/lease holder shall keep BLM's AO and the CPM informed of the circumstances and expected duration of the closure.

If BLM's AO and the CPM determine that an unplanned temporary closure is likely to be permanent, or for a duration of more than six months, a Closure Plan consistent with the requirements for a planned closure shall be developed and submitted to BLM's AO and the CPM within 90 days of BLM's AO and the CPM's determination (or other period of time agreed to by BLM's AO and the CPM).

UNPLANNED PERMANENT CLOSURE/ON-SITE CONTINGENCY PLAN (COMPLIANCE-13)

The On-Site Contingency Plan required for unplanned temporary closure shall also cover unplanned permanent facility closure. All of the requirements specified for unplanned temporary closure shall also apply to unplanned permanent closure. In addition, the On-Site Contingency Plan shall address how the project owner/lease holder will ensure that all required closure steps will be successfully undertaken in the event of abandonment.

In the event of an unplanned permanent closure, the project owner/lease holder shall notify BLM's AO and the CPM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the On-Site Contingency Plan. The project owner/lease holder shall keep BLM's AO and the CPM informed of the status of all closure activities.

To ensure that public health and safety and the environment are protected in the event of an unplanned temporary closure, the project owner/lease holder shall submit an On-Site Contingency Plan no less than 60 days after a NTP is issued for each phase of development.

POST CERTIFICATION CHANGES TO BLM'S ROW GRANT AND/OR THE ENERGY COMMISSION DECISION: AMENDMENTS, OWNERSHIP CHANGES, STAFF APPROVED PROJECT MODIFICATIONS, AND VERIFICATION CHANGES (COMPLIANCE-14)

The project owner/lease holder must petition the Energy Commission pursuant to Title 20, California Code of Regulations, Section 1769, in order to modify the project (including linear facilities) design, operation or performance requirements, and to transfer ownership or operational control of the facility. The BLM ROW holder must file a written request in the form of an application to the BLM AO in order to change the terms and conditions of their ROW grant or POD. Written requests will be in a manner prescribed by the BLM AO.

It is the responsibility of the project owner/lease holder to contact BLM's AO and the CPM to determine if a proposed project change should be considered a project modification pursuant to Title 20, California Code of Regulations, Section 1769. Implementation of a project modification without first securing BLM and either Energy Commission or Energy Commission staff approval, may result in enforcement action that could result in civil penalties in accordance with Section 25534 of the Public Resources Code.

A petition is required for amendments and for staff approved project modifications as specified below. Both shall be filed as a "Petition to Amend." Staff will determine if the change is significant or insignificant. For verification changes, a letter from the project owner/lease holder is sufficient. In all cases, the petition or letter requesting a change should be submitted to BLM's AO and the CPM, who will file it with the Energy Commission's Dockets Unit in accordance with Title 20, California Code of Regulations, Section 1209.

The criteria that determine which type of approval and the process that applies are explained below. They reflect the provisions of Title 20, California Code of Regulations, Section 1769 at the time this condition was drafted. If the Commission's rules regarding amendments are amended, the rules in effect at the time an amendment is requested shall apply.

Amendment

The project owner/lease holder shall petition the Energy Commission, pursuant to Title 20, California Code of Regulations, Section 1769(a), when proposing modifications to the project (including linear facilities) design, operation, or performance requirements. If a proposed modification results in the deletion or change of a condition of certification, or makes changes that would cause the project not to comply with any applicable laws, ordinances, regulations, or standards, the petition will be processed as a formal amendment to the Energy Commission's final decision, which requires public notice and review of the BLM-Energy Commission staff analysis, and approval by the full Energy Commission. The petition shall be in the form of a legal brief and fulfill the requirements of Section 1769(a). Upon request, the CPM will provide you with a sample petition to use as a template.

The ROW holder shall file an application to amend the BLM ROW grant for any substantial deviation or change in use. The requirements to amend a ROW grant are the same as when filing a new application including paying processing and monitoring fees and rent.

Staff Approved Project Modification

Modifications that do not result in deletions or changes to conditions of certification, and that are compliant with laws, ordinances, regulations, and standards, may be authorized by BLM's AO and the CPM as a staff approved project modification (SAPM) pursuant to Title 20, California Code of Regulations, Section 1769(a) (2). This process usually requires minimal time to complete, and requires an Energy Commission 14-day public review of the Notice of SAPM that includes the BLM and Energy Commission staff's intention to approve the modification unless substantive objections are filed. These requests must also be submitted in the form of a "Petition to Amend" as described above. BLM and the Energy Commission intend to integrate a process to jointly approve SAPMs to avoid duplication of approval processes and ensure appropriate documentation for the public record.

Change of Ownership

Change of ownership or operational control also requires that the project owner/lease holder file a petition pursuant to Title 20, California Code of Regulations, Section 1769(b). This process requires public notice and approval by the full Commission and BLM. The petition shall be in the form of a legal brief and fulfill the requirements of Title 20, California Code of Regulations, Section 1769(b). Upon request, the CPM will provide a sample petition to use as a template. The transfer of ownership of a BLM ROW grant must be through the filing of an application for assignment of the grant.

Verification Change

A verification may be modified by BLM's AO and the CPM without requesting an amendment to the ROW Grant or Energy Commission decision if the change does not require modifying any conditions of certification and provides an effective alternate means of verification.

E.9 CBO DELEGATION AND AGENCY COOPERATION

In performing construction and operation monitoring of the project, BLM and Energy Commission staff act as, and have the authority of, the Chief Building Official (CBO). BLM and Energy Commission staff may delegate CBO responsibility an independent third party contractor. BLM and the Energy Commission intend to avoid duplication by integrating the responsibilities of the CBO with those of a BLM compliance inspector and will work jointly in the selection of a CBO. BLM and Energy Commission staff retain CBO authority when selecting a delegate CBO, including enforcing and interpreting federal, state, and local codes, and use of discretion, as necessary, in implementing the various codes and standards.

BLM and Energy Commission staff may also seek the cooperation of state, regional, and local agencies that have an interest in environmental protection when conducting project monitoring.

E.10 ENFORCEMENT

BLM's legal authority to enforce the terms and conditions of its ROW Grant is specified in 43 CFR 2807.16 to 2807.19. BLM may issue an immediate temporary suspension of activities it they determine a holder has violated one or more of the terms, conditions, or stipulations of the grant. BLM may also suspend or terminate an ROW grant if a holder does not comply with applicable laws and regulation or any terms, conditions, or special stipulations contained in the grant. Prior to suspending or terminating an ROW grant, BLM will provide written notice to the holder stating it intends to suspend or terminate and will provide reasonable opportunity to correct any noncompliance.

The Energy Commission's legal authority to enforce the terms and conditions of its Decision is specified in Public Resources Code Sections 25534 and 25900. The Energy Commission may amend or revoke the certification for any facility, and may impose a civil penalty for any significant failure to comply with the terms or conditions of the Energy Commission Decision. The specific action and amount of any fines the Energy Commission may impose would take into account the specific circumstances of the incident(s). This would include such factors as the previous compliance history, whether the cause of the incident involves willful disregard of LORS, oversight, unforeseeable events, and other factors the Energy Commission may consider.

ENERGY COMMISSION NONCOMPLIANCE COMPLAINT PROCEDURES

Any person or agency may file a complaint alleging noncompliance with the conditions of certification. Such a complaint will be subject to review by the Energy Commission

pursuant to Title 20, California Code of Regulations, Section 1237, but in many instances the noncompliance can be resolved by using the informal dispute resolution process. Both the informal and formal complaint procedure, as described in current state law and regulations, are described below. They shall be followed unless superseded by future law or regulations.

Informal Dispute Resolution Process

The following procedure is designed to informally resolve disputes concerning the interpretation of compliance with the requirements of this compliance plan. The project owner/lease holder, the Energy Commission, or any other party, including members of the public, may initiate an informal dispute resolution process. Disputes may pertain to actions or decisions made by any party, including the Energy Commission's delegate agents.

This process may precede the more formal complaint and investigation procedure specified in Title 20, California Code of Regulations, Section 1237, but is not intended to be a substitute for, or prerequisite to it. This informal procedure may not be used to change the terms and conditions of certification as approved by the Energy Commission, although the agreed upon resolution may result in a project owner/lease holder, or in some cases the Energy Commission staff, proposing an amendment.

The process encourages all parties involved in a dispute to discuss the matter and to reach an agreement resolving the dispute. If a dispute cannot be resolved, then the matter must be brought before the full Energy Commission for consideration via the complaint and investigation procedure.

Request for Informal Investigation

Any individual, group, or agency may request the Energy Commission to conduct an informal investigation of alleged noncompliance with the Energy Commission's terms and conditions of certification. All requests for informal investigations shall be made to the designated CPM.

Upon receipt of a request for informal investigation, the CPM shall promptly notify the project owner/lease holder of the allegation by telephone and letter. All known and relevant information of the alleged noncompliance shall be provided to the project owner/lease holder, BLM and to the Energy Commission staff. The CPM will evaluate the request and the information to determine if further investigation is necessary. If the CPM finds that further investigation is necessary, the project owner/lease holder will be asked to promptly investigate the matter. Within seven working days of the CPM's request, the project owner/lease holder shall provide a written report to the CPM of the results of the investigation, including corrective measures proposed or undertaken. Depending on the urgency of the noncompliance matter, the CPM may conduct a site visit and/or request the project owner/lease holder to also provide an initial verbal report, within 48 hours.

Request for Informal Meeting

In the event that either the party requesting an investigation or the Energy Commission staff is not satisfied with the project owner/lease holder's report, investigation of the

event, or corrective measures proposed or undertaken, either party may submit a written request to the CPM for a meeting with the project owner/lease holder. Such request shall be made within 14 days of the project owner/lease holder's filing of its written report. Upon receipt of such a request, the CPM shall:

1. Immediately schedule a meeting with the requesting party and the project owner/lease holder, to be held at a mutually convenient time and place;
2. Secure the attendance of appropriate Energy Commission staff and staff of any other agencies with expertise in the subject area of concern, as necessary;
3. Conduct such meeting in an informal and objective manner so as to encourage the voluntary settlement of the dispute in a fair and equitable manner;
4. Promptly prepare and distribute copies to all in attendance and to the project file, after the conclusion of such a meeting, a summary memorandum that fairly and accurately identifies the positions of all parties and any understandings reached. If an agreement has not been reached, the CPM shall inform the complainant of the formal complaint process and requirements provided under Title 20, California Code of Regulations, Section 1230 et seq.

Formal Dispute Resolution Procedure-Complaints and Investigations

Any person may file a complaint with the Energy Commission's Dockets Unit alleging noncompliance with a Commission decision adopted pursuant to Public Resources Code Section 25500. Requirements for complaint filings and a description of how complaints are processed are in Title 20, California Code of Regulations, Section 1237.

KEY EVENTS LIST

PROJECT: _____

DOCKET #: _____

COMPLIANCE PROJECT MANAGER: _____

BLM AUTHORIZED OFFICER: _____

EVENT DESCRIPTION	DATE
Certification Date	
Obtain Site Control	
Online Date	
POWER PLANT SITE ACTIVITIES	
Start Site Mobilization	
Start Ground Disturbance	
Start Grading	
Start Construction	
Begin Pouring Major Foundation Concrete	
Begin Installation of Major Equipment	
Completion of Installation of Major Equipment	
First Combustion of Gas Turbine	
Obtain Building Occupation Permit	
Start Commercial Operation	
Complete All Construction	
TRANSMISSION LINE ACTIVITIES	
Start T/L Construction	
Synchronization with Grid and Interconnection	
Complete T/L Construction	
FUEL SUPPLY LINE ACTIVITIES	
Start Gas Pipeline Construction and Interconnection	
Complete Gas Pipeline Construction	
WATER SUPPLY LINE ACTIVITIES	
Start Water Supply Line Construction	
Complete Water Supply Line Construction	

Compliance Table 1
Summary of Compliance Conditions of Certification

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-1	Unrestricted Access	The project owner/lease holder shall grant BLM and Energy Commission staff, delegate agencies or consultants unrestricted access to the power plant site.
COMPLIANCE-2	Compliance Record	The project owner/lease holder shall maintain project files on-site. BLM and Energy Commission staff and delegate agencies shall be given unrestricted access to the files.
COMPLIANCE-3	Compliance Verification Submittals	The project owner/lease holder is responsible for the delivery and content of all verification submittals to BLM's Authorized Officer and the CPM, whether such condition was satisfied by work performed or the project owner/lease holder or his agent.
COMPLIANCE-4	Pre-construction Matrix and Tasks Prior to Start of Construction	<p>Construction shall not commence until the all of the following activities/submittals have been completed:</p> <ul style="list-style-type: none"> • property owners living within one mile of the project have been notified of a telephone number to contact for questions, complaints or concerns, • a pre-construction matrix has been submitted identifying only those conditions that must be fulfilled before the start of construction, • all pre-construction conditions have been complied with, • BLM's Authorized Officer and the CPM have issued a letter to the project owner/lease holder authorizing construction.
COMPLIANCE-5	Compliance Matrix	The project owner/lease holder shall submit a compliance matrix (in a spreadsheet format) with each monthly and annual compliance report which includes the status of all compliance conditions of certification.
COMPLIANCE-6	Monthly Compliance Report including a Key Events List	During construction, the project owner/lease holder shall submit monthly compliance reports (MCRs) which include specific information. The first MCR is due the month following the Energy Commission business meeting date on which the project was approved and shall include an initial list of dates for each of the events identified on the Key Events List.

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-7	Annual Compliance Reports	After construction ends and throughout the life of the project, the project owner/lease holder shall submit annual compliance reports instead of monthly compliance reports.
COMPLIANCE-8	Confidential Information	Any information the project owner/lease holder deems confidential shall be submitted to BLM and the Energy Commission's executive director with a request for confidentiality.
COMPLIANCE-9	Annual fees	Payment of Annual Energy Facility Compliance Fee to the Energy Commission;
COMPLIANCE-10	Reporting of Complaints, Notices and Citations	Within 10 days of receipt, the project owner/lease holder shall report to BLM's Authorized Officer and the CPM, all notices, complaints, and citations.
COMPLIANCE-11	Planned Facility Closure	The project owner/lease holder shall submit any revisions or changes to the Closure, Revegetation and Restoration Plan to BLM's Authorized Officer and the CPM at least 12 months prior to commencement of a planned closure.
COMPLIANCE-12	Unplanned Temporary Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned temporary closure, the project owner/lease holder shall submit an On-Site Contingency Plan no less than 60 days after an NTP is issued for each power plant.
COMPLIANCE-13	Unplanned Permanent Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned temporary closure, the project owner/lease holder shall submit an On-Site Contingency Plan no less than 60 days after an NTP is issued for each power plant.
COMPLIANCE-14	Post-certification changes to the ROW Grant and/or Decision	The project owner/lease holder must petition the Energy Commission and file an application to amend the ROW grant to delete or change a condition of certification, modify the project design or operational requirements and/or transfer ownership of operational control of the facility.

Attachment 1 - Complaint Report/Resolution Form

Complaint Log Number: _____ Docket Number: _____

Project Name: _____

COMPLAINANT INFORMATION

Name: _____ Phone Number: _____
Address: _____

COMPLAINT

DATE COMPLAINT RECEIVED: _____ TIME COMPLAINT RECEIVED: _____

COMPLAINT RECEIVED BY: ☐ TELEPHONE ☐ IN WRITING (COPY ATTACHED)

DATE OF FIRST OCCURRENCE: _____

DESCRIPTION OF COMPLAINT (INCLUDING DATES, FREQUENCY, AND DURATION): _____

FINDINGS OF INVESTIGATION BY PLANT PERSONNEL: _____

DOES COMPLAINT RELATE TO VIOLATION OF BLM ROW GRANT? ☐ YES ☐ NO

DOES COMPLAINT RELATE TO VIOLATION OF A CEC REQUIREMENT? ☐ YES ☐ NO

DATE COMPLAINANT CONTACTED TO DISCUSS FINDINGS: _____

DESCRIPTION OF CORECTIVE MEASURES TAKEN OR OTHER COMPLAINT RESOLUTION: _____

DOES COMPLAINANT AGREE WITH PROPOSED RESOLUTION? ☐ YES ☐ NO

IF NOT, EXPLAIN: _____

CORRECTIVE ACTION

IF CORRECTIVE ACTION NECESSARY, DATE COMPLETED: _____

DATE FIRST LETTER SENT TO COMPLAINANT (COPY ATTACHED): _____

DATE FINAL LETTER SENT TO COMPLAINANT (COPY ATTACHED): _____

OTHER RELEVANT INFORMATION: _____

"This information is certified to be correct."

PLANT MANAGER SIGNATURE: _____ DATE: _____

(ATTACH ADDITIONAL PAGES AND ALL SUPPORTING DOCUMENTATION, AS REQUIRED)

F. LIST OF PREPARERS AND REVIEWERS

RIDGECREST SOLAR POWER PROJECT

LIST OF PREPARERS & REVIEWERS

CALIFORNIA ENERGY COMMISSION

Executive Summary	Eric Solorio
Introduction	Eric Solorio
Description of Proposed Project and Alternatives	Eric Solorio
Alternatives	Suzanne Phinney
Cumulative Scenario	Suzanne Phinney
Air Quality.....	Tao Jiang and William Walters, P.E.
Biological Resources.....	Richard Anderson, David Bise, Andrea Martine, and Joy Nishida
Cultural Resources and Native American Values.....	Glenn Farris and Michael McGuirt
Hazardous Materials Management	Alvin Greenberg, Ph.D.
Public Health and Safety	Alvin Greenberg, Ph.D.
Land Use, Recreation, and Wilderness	Shaelyn Strattan
Noise and Vibration.....	Erin Bright
Socioeconomics and Environmental Justice	Sue Walker
Soil and Water Resources.....	Michael Donovan P.G., C.Hg., Michael Daly P.E., and John R. Thornton P.E.
Traffic and Transportation	Robert Fiore
Transmission Line Safety and Nuisance	Obed Odoemelam, Ph.D.
Visual Resources	Michael Clayton
Waste Management	Suzanne Phinney, D.Env.
Worker Safety and Fire Protection	Alvin Greenberg, Ph.D.
Facility Design.....	Shahab Khoshmashrab
Geology, Paleontology, and Minerals.....	Dal Hunter
Power Plant Efficiency.....	Shahab Khoshmashrab
Power Plant Reliability.....	Shahab Khoshmashrab
Transmission System Engineering.....	Ajoy Guha, P. E. and Mark Hesters
General Conditions.....	Dale Rundquist
Project Assistant	April Albright

BUREAU OF LAND MANAGEMENT

Ridgecrest Field Office

Supervisory Recreation Craig Beck
Wildlife Biologist Shelley Ellis
Natural Resource Specialist Glenn Harris
Supervisory Resource Management Specialist Robert Pawelek
Field Manager Hector Villalobos
Archaeologist Donald Storm
Realty Specialist Paul Rodriguez
Supervisory Geologist Linn Gum
Geologist Randy Porter

El Centro Field Office

Archaeologist Tom Zale

California Desert District

RECO Program Manager Greg Miller
Planning and NEPA Coordinator Lynnette Elser
Planning and NEPA Coordinator Jeff Childers
DDM, Resources Alan Stein
CDD Biologist Larry LaPre
Ecology and Environmental Contractor David McIntyre
Project Manager Janet Eubanks
Business Support Assistant Florence Smith
Hydrologist Noel Ludwig
Archaeologist Rolla Queen
Clerk Elizabeth Traub

California State Office

Planning and NEPA Coordinator Sandra McGinnis

OFFICE OF THE SOLICITOR

Solicitor, Pacific Southwest Regional Solicitor's Office Kevin Tanaka
Solicitor, Department of Interior's Solicitor's Office Michael Hickey

**G. WITNESS
QUALIFICATIONS AND
DECLARATIONS**

**DECLARATION OF
Eric K. Solorio**

I, Eric Solorio, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as a Project Manager (Planner III).
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on the **Executive Summary, Introduction, and Description of Project and Alternatives** in the Staff Assessment/Draft Plan Amendment/Draft Environmental Impact Statement for the **Ridgecrest Solar Power Project** (09-AFC-9) based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 3-19-10

Signed: Original signed by E. Solorio

At: Sacramento, California

ERIC SOLORIO

SUMMARY

I'm currently a project manager for the California Energy Commission. I have seven years of experience managing business operations for real estate development companies and three years of experience with economic development through international trade and foreign direct investment. I have a working knowledge of the California Environmental Quality Act. My strengths are in business development, strategic planning, team building, economic analysis, and raising private equity. I'm experienced with managing diverse groups of people to accomplish common objectives.

PROFESSIONAL EXPERIENCE

Presentation Skills

- Organize and participate in public workshops to facilitate public participation in the environmental review of large-scale real estate development projects, up to 4,000 acres in size.
- Organize and participate in international trade and investment, "business to business" workshops.
- Organize and participate in international trade and investment, business development seminars.
- Make presentations to foreign delegations and dignitaries to solicit "foreign direct investment" into California business ventures.
- Assist with implementing protocol for receiving foreign trade delegations visiting California.

Technical Skills

- Review and analyze Application(s) for Certification submitted to the California Energy Commission for proposed, utility-scale thermal power plant development.
- Manage the development of comprehensive environmental impact reports, in accordance with the California Environmental Quality Act, the Warren Alquist Act, the federal Clean Air Act and the federal Clean Water Act.
- Develop and maintain financial models for various business types: real estate development, resource development (forestry) and international trade (technology transfers).
- Work with the following software applications: Access, Excel, PowerPoint, Project and Word.

Legislation and Policy Analysis

- Review and analyze proposed legislation that could affect international trade and investment in California, and draft official Agency opinions.

Writing

- I've written weekly reports to the Governor's office (two years), business plans, letters, memos and environmental impact reports.

EMPLOYMENT HISTORY

October 2008 – Present	Project Manager	California Energy Commission; Siting, Transmission and Environmental Protection Division
May 1999 – April 2008	Owner / Manager	Various Real Estate Development Partnerships in California
Sept. 2001 – Nov. 2002	Owner / Manager	Technology Transfer Services
Nov. 1999 – August 2001	Special Assistant to Deputy Secretary	California Trade and Commerce Agency, International Trade and Investment Division

EDUCATION

California State University at Sacramento

Major: International Business

Minor: Economics

DECLARATION OF Suzanne L. Phinney, D.Env.

I, Suzanne L. Phinney, declare as follows:

1. I am presently employed by Aspen Environmental Group, consultant to the California Energy Commission's Facilities Siting Office of the Systems Assessments and Facilities Siting Division as a Senior Associate.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff testimony on Alternatives, Cumulative Scenario and Waste Management for the **Ridgecrest Solar Power Project** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony and errata is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and errata and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 3/18/2010 Signed: Original signed by S. Phinney

At: Sacramento, California



SUZANNE L. PHINNEY

Senior Associate, Energy and Infrastructure

ACADEMIC BACKGROUND

Doctorate, Environmental Science & Engineering (D.Env.), University of California, Los Angeles, 1981
M.S., Marine Biology, Dalhousie University, Halifax, Nova Scotia, Canada, 1975
B.A., Biological Sciences, University of California, Berkeley, 1973

PROFESSIONAL EXPERIENCE

Dr. Phinney has 30 years of experience in the environmental and energy field, providing technical and policy support in energy analysis, environmental assessment, environmental remediation, air and water quality assessments, risk assessment, regulatory compliance, permitting, and project/program management. Her particular emphasis is energy and infrastructure with projects addressing climate change, alternative energy generation technologies, liquefied natural gas, petroleum infrastructure, advanced transportation vehicles and fuels, land use and energy, and power plant siting. Prior to employment at Aspen, Dr. Phinney worked for 16 years with Aerojet, where she oversaw all environmental and safety issues.

Aspen Environmental Group

2001 to present

Dr. Phinney manages energy and infrastructure projects for Aspen and provides environmental support on major projects. She has provided energy and environmental expertise to the following clients:

California Energy Commission (CEC). Dr. Phinney has supported CEC staff since 2001. She has prepared CEQA equivalent analyses for multiple power plants throughout the State, and has authored or contributed to over a dozen special studies. She is currently Deputy Program Manager for planning studies conducted by the Aspen team. Her major efforts for the CEC include the following.

- **Power Plant Siting, CEC, Project Management/Technical Support (2001 – Present).** Dr. Phinney prepared the alternatives analysis for the following list of power plants under review by the Energy Commission. The Alternatives analysis considers renewable technologies, including utility-scale and distributed PV.
 - **Palomar Energy Project** – 500 MW combined-cycle natural gas facility in Escondido, San Diego County
 - **Russell City Energy Center** – 600 MW combined-cycle natural gas facility in Hayward, Alameda County
 - **Eastshore Energy Center** - 115.5 MW simple-cycle natural gas facility in Hayward, Alameda County
 - **Carrizo Energy Solar Farm** – 177 MW solar thermal (Compact Linear Fresnel Reflector) plant in the Carrizo Plain, San Luis Obispo County
 - **CPV Sentinel Energy Project** – 850 MW natural gas plant in the Coachella Valley, Riverside County
 - **Marsh Landing Generating Station**- 930 MW natural gas plant within the existing Contra Costa Power Plant in Antioch, Contra Costa County
 - **Orange Grove Project** – 96 MW natural-gas peaking facility near Pala, San Diego County
 - **Willow Pass Generating Station** – 550 MW natural gas plant within the existing Pittsburg Power Plant in Pittsburg, Contra Costa County

- **Almond 2 Peaking Power Plant Project** – 174 MW natural-gas peaking facility near Ceres, Stanislaus County
- **Abengoa Mojave Solar Project** – 250 MW solar thermal (parabolic trough) plant near Harper Dry Lake, San Bernardino County
- **Ridgecrest Solar Power Project** – 250 MW solar thermal (parabolic trough) plant on 3,920 acres of BLM land near Ridgecrest, Kern County
- **Rice Solar Energy Project** – 150 MW solar thermal (power tower) plant with molten salt storage in Riverside County

Dr. Phinney prepared the waste management assessments of power plant licensing applications:

- **Eastshore Energy Center** – 115.5 MW natural gas simple-cycle plant in Hayward, Alameda County
- **Carrizo Energy Solar Farm** – 177 MW solar thermal (Compact Linear Fresnel Reflector) plant in the Carrizo Plain, San Luis Obispo County
- **Palmdale Hybrid Power Project** – 570 MW natural gas-solar thermal (parabolic trough) hybrid plant in Palmdale, Los Angeles County
- **SES Solar Two Siting Case** – 750 MW solar thermal (Stirling dish) plant on 6,500 acres of mostly BLM land in Imperial County
- **Hanford Energy Park Peaker Plant** – 120 MW simple-cycle, natural gas facility in Hanford, Kings County
- **Ridgecrest Solar Power Project** – 250 MW solar thermal (parabolic trough) plant on 3,920 acres of BLM land near Ridgecrest, Kern County
- **Blythe Solar Power Project** – 1,000 MW solar thermal (parabolic trough) plant on 9,400 acres of BLM land near Blythe, Riverside County
- **Palen Solar Power Project** – 500 MW solar thermal (parabolic trough) plant on 5,200 acres of BLM land in the Chuckwalla Valley, Riverside County

Dr. Phinney also coordinated the study of cooling water alternatives for the Tesla and Tracy natural gas, combined-cycle power plants.

Energy Policy Studies, CEC, Project Management/Technical Support (2001 – Present). Dr. Phinney prepared the policy reports and provided expert support to the Energy Commission on the following projects:

- **RETI Stakeholder Steering Committee Support, CEC, Project Team (2010).** Dr. Phinney is supporting state agency coordination of and stakeholder input to support California ISO and publicly-owned utility planning of initial Competitive Renewable Energy Zone (CREZ)-transmission projects and update CREZ and conceptual transmission plan to facilitate project applications and permitting approvals beyond 2010.
- **Energy Aware Facility Planning and Siting Guide, CEC, Project Manager (2009-2010).** Dr. Phinney is updating a 1997 version of the Energy Aware Guide to help local governments plan for and permit electricity generation facilities and transmission lines that will be needed in the upcoming years. The Guide informs planners, decision makers and the public about what, how, and why electricity infrastructure may be developed.
- **Environmental Screening Tool for Out-of-State Renewable Energy Facilities, CEC, Project Manager (2009).** Dr. Phinney prepared an environmental screening tool/analysis allowing CEC to determine quickly whether out-of-state renewable facilities requesting RPS certification met California laws, ordinances, regulations and standards.
- **Advanced Energy Pathways, CEC, Project Manager (2006 – 2008).** Dr. Phinney provided project management support for a 3-year study evaluating the effects of advanced transportation technologies and fuels (out to 2050) on California's natural gas and electricity systems. This report involved the

development of baseline and alternative energy demand and supply scenarios, in-depth technical analysis of advanced transportation technologies and fuels, and the development of an energy-rich model.

- **Environmental Performance Report, CEC, Project Manager/Technical Support (2001, 2003, 2005).** Dr. Phinney was Project Manager for Aspen's technical contributions, graphics and production efforts for the 2001 Environmental Performance Report (EPR) which detailed the current and historical air, water and biological impacts from in-state generation facilities. She provided support to the water resources discussion in the 2003 EPR and managed the analysis of out-of-state generation facilities for the 2005 EPR.
- **Advanced Electric Generation Technologies, CEC, Project Manager (2001 - 2002).** Dr. Phinney served as Project Manager for a report defining the technical development, developmental capacity, commercial status, costs and deployment constraints of selected alternative electric generation technologies. Technologies included geothermal, fuel cell, solar thermal, solar photovoltaic, wind and hydro. The focus was on development and application of the technology in California. Two page fact sheets on each technology and a matrix comparing all technologies was developed. Finally, an updated discussion of renewable technologies was developed for insertion into the alternatives section of Staff Assessments for power plant applications.
- **Liquefied Natural Gas Support, CEC, Technical Author (2002 – 2007).** Dr. Phinney has been instrumental in the preparation of numerous safety and policy reports on liquefied natural gas (LNG). She authored the Commission document: *International and National Efforts to Address the Safety and Security of Importing Liquefied Natural Gas: A Compendium*. This report reviewed national and international LNG regulations, standards and guidelines, reviewed risk assessment techniques, and identified, compiled and reviewed LNG safety/risk studies. Dr. Phinney helped organize LNG Access Workshops held in June 2005 and prepared a 40 page summary of presentations made at the workshops. She developed over 30 fact sheets on LNG subject areas for distribution to the public. Dr. Phinney compiled state and local comments on a proposed LNG terminal at the Port of Long Beach; these were presented in the *Safety Advisory Report on the Proposed Sound Energy Solutions Natural Gas Terminal at the Port of Long Beach, California*, which was delivered to the Federal Energy Regulatory Commission within the mandated 30-day period imposed by the 2005 federal Energy Bill. She provided technical review for the report *The Outlook for Global Trade in Liquefied Natural Gas Projections to the year 2020*.
- **Natural Gas Market Assessment Support, CEC, Technical Author/Editorial Support (2005 – 2007).** Dr. Phinney contributed to natural gas supply and demand analyses for the Commission document, *Natural Gas Assessment Update*. She provided support to the 2005 and 2007 Integrated Energy Policy Report (IEPR) documents, *Preliminary (and subsequently the Revised report) Reference Case in Support of the 2005 Natural Gas Market Assessment* and *2007 Natural Gas Market Assessment*. She edited the Commission document *Natural Gas Quality: Power Turbine Performance During Heat Content Surges*.
- **Petroleum Infrastructure Environmental Performance Report, CEC, Project Manager (2005).** Dr. Phinney served as Project Manager for the 2005 IEPR document *Petroleum Infrastructure Environmental Performance Report*. In addition to managing preparation of the report and workshop presentations, she prepared responses to comments and provided policy recommendations.
- **Hydropower and Global Climate Change, CEC, Technical Author (2005).** Dr. Phinney coauthored the document *Potential Changes in Hydropower Production from Global Climate Change in California and the Western United States*. This report investigated the effects of climate change on hydropower production in the West and compared impacts and policy actions in California, the Pacific Northwest, and the Southwest.
- **Land Use and Energy, CEC, Project Manager/Technical Author (2006 – 2008).** Dr. Phinney authored a CEC report on the linkages between land use and energy, which ultimately became one of

the two chapters presented in the 2006 IEPR Update. The report highlighted how energy can be better integrated in land use planning, and how efforts such as smart growth can help the state meet its energy and greenhouse gas emission reduction goals. She organized a full-day workshop involving over a dozen speakers representing state agencies, local governments, research entities, environmental groups, utilities, and non-profits. Dr. Phinney was one of the authors of the 2007 land use and energy follow-up report which further defined the role of land use in meeting California's energy and climate change goals. She helped synthesize the report into a chapter for the 2007 IEPR. Dr. Phinney helped edit the Land Use Subgroup of the Climate Action Team report prepared for submission to the California Air Resources Board AB 32 Scoping Plan.

- **AB 1632 Nuclear Power Plant Assessment, CEC, Technical Author (2007 – 2008).** Dr. Phinney was a key member of a team evaluating nuclear power issues in the state in response to AB 1632 legislation. She managed and prepared report sections regarding the impacts to local communities and the environmental issues and costs associated with alternatives, including renewables, to the state's two nuclear facilities. These sections were incorporated in the report *An Assessment of California's Nuclear Power Plants*.

California Public Utilities Commission. Dr. Phinney has managed several environmental assessments for the CPUC and supported many other CPUC documents prepared by Aspen.

- **Looking Glass Network Initial Study/Mitigated Negative Declaration, CPUC, Project Manager (2002 – 2003).** Dr. Phinney served as Project Manager for the preparation of Initial Study/Mitigated Negative Declarations (IS/MND) for this telecommunication project that involved construction in the San Francisco Bay Area and the Los Angeles Basin to allow fiber optic connections in numerous locations.
- **Williams Communications Sentry Marysville Project IS/MND, CPUC, Project Manager (2002 – 2003).** Dr. Phinney served as Project Manager for the installation of fiber optic connection to a Beale Air Force Base in Yuba County.
- **Kirby Hills II Natural Gas Storage Facility IS/MND, CPUC, Project Manager (2007).** Dr. Phinney managed an IS/MND for expansions at a natural gas storage facility in Solano County.
- **Multiple EIR Documents, CPUC, Technical Editor (2004 - 2008).** Dr. Phinney provided editorial and QA/QC review for the Diablo Canyon Steam Generator Replacement EIR, the Miguel Mission 230 kV Transmission Line EIR and the Sunrise Powerlink EIR/EIS.

California Institute of Technology/University of California. Dr. Phinney provided project management support to the following project.

- **Combined Array for Research in Millimeter-wave Astronomy EIS/EIR, U.S. Forest Service and the University of California (2001 – 2002).** Dr. Phinney was the Project Manager for this EIS/EIR for a radio telescope antenna array to be placed at a high altitude site in the Inyo National Forest. The evaluation of alternatives was especially contentious, and Aspen's field analyses of several potential sites were pivotal in the ultimate selection of one of these alternative sites.

Western Area Power Administration. Dr. Phinney provided editorial and QA/QC support to the following projects.

- **North Area ROW Maintenance Project Environmental Assessment, Western, Technical Editor/QA/QC (2006-2008).** Dr. Phinney provided technical editing and QA/QC support for all documents relating to the development of 800 miles of transmission lines in Northern California.
- **Sacramento Area Voltage Support Supplemental EIS/EA, Technical Editor/QA/QC (2006 – 2008).** Dr. Phinney provided technical editing and QA/QC support for all environmental documentation and permitting for new construction and reconstruction of transmission lines in the greater Sacramento area.

Vermont Yankee Nuclear Power Plant Report, Vermont Department of Public Service, Project Manager (December 2008 to January 2009). Dr. Phinney was the Project Manager and provided technical support for the environmental analysis of the continued operation of the Vermont Yankee Nuclear Power Station in Vernon, Vermont. The report assessed the environmental impacts to land, water and air resources (including climate change), soil and seismicity, on-site and off-site storage and disposal of high-level and low-level nuclear waste.

GenCorp

1999 to 2000

- As Vice President, Environmental and Regulatory Affairs, Dr. Phinney held primary responsibility for coordinating the company's aerospace and automotive environmental activities with various federal, State, and local regulatory agencies. Her specific responsibilities included: working with external groups and entities to develop responsible environmental legislation, regulations, and standards and the implementation of sound public policy; developing stakeholder base and strategy to ensure that company objectives were achieved; facilitating company and regulatory agency discussions to achieve more comprehensive and quicker remediation of sites; and spearheading a stakeholder group to develop and fund scientific studies on selected chemicals of concern.

Aerojet General Corporation

1984 to 1999

As Vice President, Environmental Health and Safety, Dr. Phinney ensured that programs were in place to meet all regulatory requirements and company initiatives. Her responsibilities included: providing strategic direction and management of all superfund-related investigation and remediation activities; developing environmental management plans; communicating environmental requirements, concerns, and successes to both internal and external audiences, including the board of directors, investment banking, and the analyst community; and participating as a member of the leadership council in defining company-wide business objectives and targets.

- Dr. Phinney created the first corporate EHS department, defining and staffing key functional areas. She managed a \$20,000,000 annual budget and oversaw a staff of up to 30 professionals. Select accomplishments include: the development of remediation technologies that resulted in the cleanup of over 50 billion gallons of contaminated groundwater; development of the world's first groundwater treatment facility for perchlorate; significant reductions in emissions and hazardous waste generation; representation on numerous legislative and regulatory task forces and leadership positions on external business and community EHS committees and councils; and extensive public outreach efforts.

PREVIOUS EXPERIENCE, 1976 TO 1984

Jacobs Engineering Group. Dr. Phinney conducted toxicological, ecological, and air and water quality assessments.

Department of Environmental Science and Engineering at the University of California, Los Angeles. Dr. Phinney analyzed legal, economic, public health, and administrative barriers to waste water reuse. She also conducted an analysis of ecological and institutional factors in coastal siting of power plants.

Southwest Los Angeles Junior College. Dr. Phinney taught lecture and laboratory courses in general science.

TRAINING

- Certificate, Executive Program, University of California, Davis, 1989
- Expert Witness Training, California Energy Commission, 2001

HONORS AND AWARDS

- Who's Who of American Women, 18th Edition

- YWCA Outstanding Woman of the Year (Sciences) Award, 1992
- Woman of Achievement Award, Downtown Capitol Business and Professional Women, 1993
- Individual Award for Outstanding Contribution in Air Quality, 1995
- Sacramento Safety Center Incorporated, Eagle Award for Safety, 1998
- Regional Award for Outstanding Contribution in Air Quality, 2003

ACTIVITIES AND ASSOCIATIONS

- Editorial Board, The Environmental Professional, 1987-1989
- City of Sacramento Toxic Substances Commission, 1986-1988
- Sacramento Environmental Commission, 1988-1991
- Board of Directors, League of Women Voters of Sacramento, 1989-1999; President 1996-1997; Co-President 1997-1998; 2003-2005; Energy Study Committee 2005; Moderator/Facilitator of Debates and Forums (e.g., climate change, the SACOG's MTP, and flood control)
- Toxics Consultant, League of Women Voters of Sacramento, 1988-1989
- Member, Advisory Committee on AB 3777 (Risk Management Prevention Programs)
- Board of Directors, American Lung Association of Sacramento-Emigrant Trails, 1992-2000; President 1998-1999;
- Board of Directors, Sacramento Metropolitan Chamber of Commerce, 1992-1997; Vice President, Public Policy, 1996-1997
- Board of Directors, Air and Waste Management Association, 1991-1994
- Steering Committee Chair, Cleaner Air Partnership, 1993-1996, 2000-2001; Executive Committee 1993 to present
- Co-chair, TCE Issues Group, 1994-2000
- Sacramento Water Forum, 1995-2000
- Rate Advisory Committee, Sacramento Municipal Utility District, 1999-2001

SELECTED PUBLICATIONS/PRESENTATIONS

- Phinney, S.L., Panel Moderator, Climate Change Initiatives for California, AEP Annual Conference, Shell Beach, California, 2007.
- Phinney, S.L., Panel Moderator, Is there a Need for LNG in California, AEP Annual Conference, Shell beach, California, 2007.
- Phinney, S.L., "LNG Safety Analysis in California – Federal, State and Local Processes" Presented at California Foundation on the Environment and the Economy, 2005.
- Phinney, S.L., "Energy Basics" Presented at League of Women Voters of California Annual Convention, 2005.
- Phinney, S.L., Presentation to U.S. Department of Justice, Office of the U.S. Attorney, on Women and Equality, 2004.
- Phinney, S.L., "Trends in Industrial Waste Generation and Management" Presented at National Ground Water Association Conference, Las Vegas, Nevada, 1996.
- Phinney, S.L., "Effective Management of an RI/FS to Reduce Financial Exposure," Manufacturers Alliance Environmental Management Council, Washington, D.C., 1995.
- Phinney, S.L., "Knowing Your Compliance Challenge," 7th Annual California Statewide Community Awareness and Emergency Response (CAER) Conference, Sacramento, California, 1995.
- Phinney, S.L., "Industry's Role in Broadening the Use of Alternative Fuels in America," Clean Cities Ceremony, Sacramento, California, 1994.
- Phinney, S.L., "Aerospace Industry Perspective on Defense Conversion," AAAS Annual Meeting, San Francisco, California, 1994.
- Phinney, S.L., "Aerojet's Waste Reduction Successes," Business for the Environment Conference, Sacramento, California, 1993.

- Phinney, S.L., "Company Worker Trip Reduction Programs Under the Clean Air Act Amendments." MAPI Hazardous Materials Management Council, Washington, D.C., 1993.
- Phinney, S.L., Testimony Before House Government Operations Subcommittee, 1993.
- Phinney, S.L., Moderator, The Clean Air Act, A Public Forum, Sacramento, California, 1993.
- Phinney, S.L., Plenary Session Chairperson and Speaker, "Business and the Environment: Must You Sacrifice One for the Other?" National Association of Environmental Professionals Conference, Seattle, Washington, 1992.
- Phinney, S.L., "Facing the Challenge: The New California EPA." HazMat Northern California Conference, San Jose, California, 1992.
- Phinney, S.L., "Understanding the Client Perspective." Environmental Business Conference, Pasadena, California, 1991.
- Phinney, S.L., Panelist – Women of Science: Secrets of Success. Workshop, AAAS Annual Meeting, Washington, D.C., 1991.
- Phinney, S.L., Keynote Address, ADPA International Symposium on Compatibility and Processing, San Diego, California, 1991.
- Phinney, S.L., Keynote Address, Women in Science and Technology Conference, Jackson, Mississippi, 1991.
- Phinney, S.L., Guest Speaker, Sacramento County Bar Association, Environmental Law Section, Sacramento, California, 1991.
- Phinney, S.L., "Managing CERCLA Compliance from the Corporate Perspective." Hazardous Materials Management Conference/West, Long Beach, California, 1988.
- Phinney, S.L., and C.A. Fegan, "Identifying a Feasible, Effective Treatment Method for an Unusual Chemical of Concern." Proceedings, American Defense Preparedness Association 16th Environmental Symposium, New Orleans, Louisiana, 1988.
- Phinney, S.L., "A Proactive Superfund Cleanup by Industry." Proceedings of the 4th Annual Hazardous Materials Management Conference/West, Long Beach, California, 1988.
- Thompson, C.H., S.L. Phinney and F.R. McLaren, "Aerojet: A Regional Site Program – Problem Definition." Proceedings of the Hazardous Waste and Environmental Emergencies Conference, Cincinnati, Ohio, 1985.
- Kahane S.W., S.L. Phinney and A. Wright, "The Tightening Environmental Regulatory Climate for Hazardous Waste Management – Current Mandates and Future Directions for Industrial Compliance." Proceedings of the 1984 AIChE Summer National Meeting, Philadelphia, Pennsylvania, 1984.
- Bachrach, A., D.M. Morycz, S.L. Phinney and S.W. Kahane, "Regulation and Offshore Oil and Gas Facilities." In: Emerging Energy/Environmental Trends and the Engineer. Eds. R.D. Nuefeld and R.W. Goodwins, 1983.
- Lindberg, R.G., S.L. Phinney, J. Daniels and J. Hastings (eds.), "Environmental Assessment of the U.S. Department of Energy's Solar Thermal Technology Program." Prepared for the U.S. Department of Energy, June 1982.
- Kahane, S.W., S.L. Phinney, J.A. Hill and R.C. Sklarew, "Key Considerations in Assessing the Air Impacts of Projected Outer Continental Shelf Oil and Gas Development," presented at the 74th Annual Air Pollution Control Association Meeting, Philadelphia, Pennsylvania, 1981.
- Phinney, S.L., "The U.S. Environmental Protection Agency's Pesticide Registration Program: A Case Study – Chloramben." Doctoral Dissertation, Environmental Science and Engineering Program, University of California, Los Angeles, California, 1981.
- Phinney, S.L., (contributing author) et al. "Institutional Barriers to Wastewater Reuse in Southern California." Environmental Science and Engineering Report Prepared for the Office of Water Research and Technology, U.S. Department of the Interior, 1979.
- Phinney, S.L., "Area-Restricted Feeding in American Plaice." Masters Thesis. Dalhousie University, Halifax, Nova Scotia, Canada, 1975.

**DECLARATION OF
Tao Jiang**

I, Tao Jiang, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as an Air Resources Engineer.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on the **Air Quality** for the **Ridgecrest Solar Power Project** (09-AFC-9) based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: March 10, 2010

Signed: Original signed by T. Jiang

At: Sacramento, California

Tao Jiang, Ph.D.

Professional Experience

Air Resources Engineer

(Jan. 2009 – Present)

California Energy Commission, Siting Transmission and Environmental Protection Division

Currently acting as air quality technical staff on Siting projects filed with the Energy Commission including Abengoa Mojave Solar, Ridgecrest Solar Millennium and Almond 2 Power Plant, and compliance projects including 42 power plants in construction and operation. Specific responsibilities include the following:

- Analyze the impacts of the construction and operation of large power generation projects on air quality, Green House Gas and climate change
- Determine the conformance to applicable U.S. EPA, CARB and local air district regulations and standards
- Investigate and recommend appropriate emission mitigation measures
- Prepare air quality staff assessments and technical testimony
- Develop and monitor air quality compliance plans
- Review and evaluate U.S. EPA, CARB, and local air district air quality rules and regulations
- Collect, analyze and evaluate data for the effects of air pollutants and power plant emissions on human health, vegetation, wildlife, water resources and the environment
- Develop, recommend, and implement statewide planning and policy initiatives for the Energy Commission and Governor

Research assistant

(Sep. 2004 – Dec. 2008)

University of California, Riverside, Chemical & Environmental Engineering

- Investigated phase behavior of air colloidal particles
- Study mediated colloidal interactions in the air particle dispersions
- Construct and evaluate models for gas molecules and air particulate matters
- Perform computer simulation and modeling for gas molecules and air particulate matters

Education

PhD	Chemical & Environmental Engineering, University of California, Riverside (August, 2008)
ME	Materials Science and Engineering, Beijing University of Chemical Technology (June, 2003)
BE	Materials Science and Engineering, Beijing University of Chemical Technology (June, 2000)

DECLARATION OF
Testimony of William Walters, P.E.

I, **William Walters**, declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission's Siting, Transmission and Environmental Protection Division, as a senior associate in engineering and physical sciences.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff testimony on **Air Quality** and **Greenhouse Gases** for the **Ridgecrest Solar Power Plant** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: March 17, 2010

Signed: Original signed by W. Walters

At: Agoura Hills, California

WILLIAM WALTERS, P.E.
Air Quality Specialist

ACADEMIC BACKGROUND

B.S., Chemical Engineering, 1985, Cornell University

PROFESSIONAL EXPERIENCE

Mr. Walters has over 20 years of technical and project management experience in environmental compliance work, including environmental impact reports, emissions inventories, source permitting, energy and pollution control research RCRA/CERCLA site assessment and closure, site inspection, and source monitoring.

Aspen Environmental Group

2000 to present

Responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

■ **Engineering and Environmental Technical Assistance to Conduct Application for Certification Review for the California Energy Commission:**

- Preparation and project management of the air quality section of the Staff Assessment and/or Initial Study and the visual plume assessment for the following California Energy Commission (CEC) licensing projects: Hanford Energy Park; United Golden Gate, Phase I; Huntington Beach Modernization Project (including Expert Witness Testimony); Woodland Generating Station 2; Ocotillo Energy Project, Phase I; Magnolia Power Project; Colusa Power Project; Inland Empire Energy Center; Rio Linda/Elverta Power Plant Project; Roseville Energy Center; Henrietta Peaker Project; Tracy Peaking Power Plant Project (including Expert Witness Testimony); Avenal Energy Project; San Joaquin Valley Energy Center (including expert witness testimony); Salton Sea Unit 6 Project (including expert witness testimony); Modesto Irrigation District Electric Generation Station (including expert witness testimony); Walnut Energy Center (including expert witness testimony); Riverside Energy Resource Center (including expert witness testimony); Pastoria Energy Facility Expansion; Panoche Energy Center; Starwood Power Plant; and Riverside Energy Resource Center Units 3 and 4 Project (in progress).
- Preparation and project management of the visual plume assessment for the following California Energy Commission (Energy Commission) licensing projects: Metcalf Energy Center Power Project (including Expert Witness Testimony); Contra Costa Power Plant Project (including Expert Witness Testimony); Mountainview Power Project; Potrero Power Plant Project; El Segundo Modernization Project; Morro Bay Power Plant Project; Valero Cogeneration Project; East Altamont Energy Center (including expert witness testimony); Russell City Energy Center; SMUD Cosumnes Power Plant Project (including expert witness testimony); Pico Power Project; Blythe Energy Project Phase II; City of Vernon Malburg Generating Station; San Francisco Electric Reliability Project; Los Esteros Critical Energy Facility Phase II; Roseville Energy Park; City of Vernon Power Plant; South Bay Replacement Project; Walnut Creek Energy Park; Sun Valley Energy Project; Highgrove Power Plant; Colusa Generating Station; Russell City Energy Center; Avenal Energy Project; Carlsbad Energy Center; Community Power Project; Panoche Energy Center; San Gabriel Generating Station; Sentinel Energy Project; and Victorville 2 Hybrid Power Project.
- Assistance in the aircraft safety review of thermal plume turbulence for the Riverside Energy Resources Center; Russell City Energy Center Amendment (including expert witness testimony); Eastshore Energy Power Plant (including expert witness testimony); Carlsbad Energy Center (in progress), Riverside Energy Resource Center Units 3 and 4 Project; Victorville 2 Hybrid Power Project; and the Blythe Energy Power

Plant and Blythe Energy Project Phase II (including expert witness testimony) siting cases. Assistance in the aircraft safety review of thermal and visual plumes of the operating Blythe Energy Power Plant. Preparation of a white paper on methods for the determination of vertical plume velocity determination for aircraft safety analyses.

- Preparation and instruction of a visual water vapor plume modeling methodology class for the CEC.
- Preparation and project management of the public health section of the Initial Study for the Woodland Generating Station 2 Energy Commission licensing project.
- Preparation of project amendment or project compliance assessments, for air quality or visual plume impacts, for several licensed power plants, including: Metcalf Energy Center; Pastoria Power Plant; Elk Hills Power Plant; Henrietta Peaker Project; Tracy Peaker Project; Magnolia Power Project; Delta Energy Center; SMUD Cosumnes Power Plant; Walnut Energy Center; San Joaquin Valley Energy Center; City of Vernon Malburg Generating Station; Otay Mesa Power Plant; Los Esteros Critical Energy Facility; Pico Power Project; Riverside Energy Resource Center; Blythe Energy Project Phase II; Inland Empire Energy Center; Salton Sea Unit 6 Project; and Starwood Power-Midway Peaking Power Plant.
- Preparation of the air quality section of the staff paper “A Preliminary Environmental Profile of California’s Imported Electricity” for the Energy Commission and presentation of the findings before the Commission.
- Preparation of the draft staff paper “Natural Gas Quality: Power Turbine Performance During Heat Content Surge”, and presentation of the preliminary findings at the California Air Resources Board Compressed Natural Gas Workshop and a SoCalGas Technical Advisory Committee meeting.
- Preparation of the staff paper “Emission Offsets Availability Issues” and preparation and presentation of the Emission Offsets Constraints Workshop Summary paper for the Energy Commission.
- Preparation of information request and data analysis to update the Energy Commission’s Cost of Generation Model capital and operating cost factors for combined and simple cycle gas turbine projects. Additionally, performed a review of the presentation for the revised model as part of the CEC’s 2007 Integrated Energy Policy Report workshops, and attended the workshop and answering Commissioner questions on the data collection and data analysis.
- For the **Los Angeles Department of Water and Power (LADWP)**:
 - Preparation of the Air Quality Inventory for the LADWP River Supply Pipeline Project EIR.
 - Project management and preparation of the Air Quality Section for the LADWP Valley Generating Station Stack Removal IS/MND support project.
- For the **U.S. Army Corps of Engineers (Corps)**:
 - Preparation of the Air Quality Section and General Conformity Analysis for the Matilija Dam Ecosystem Restoration Project EIS/R for the Corps.
 - Preparation of emission inventory and General Conformity Analysis of the Murrieta Creek Flood Control Project and the Joint Red Flag exercise to be conducted in the Nevada Test and Training Range.
 - Emission inventory for the construction activities forecast for the San Jose/Old San Jose Creeks Ecosystem Restoration project for the Corps.
- Other Projects:
 - Preparation of the Air Quality Section of the LAUSD New School Construction Program EIR and provided traffic trip and VMT calculation support for the Traffic and Transportation Section.

- Preparation of the draft staff paper “Natural Gas Quality: Power Turbine Performance During Heat Content Surge”, and presentation of the preliminary findings at the California Air Resources Board Compressed Natural Gas Workshop and a SoCalGas Technical Advisory Committee meeting.
- Preparation of the Air Quality Section of the Environmental Information Document in support of the Coastal Consistency Determinations for the suspension of operation requests for undeveloped units and leases off the Central California Coast.
- Preparation of comments on the Air Quality, Alternatives, Marine Traffic, Public Safety, and Noise section of the Cabrillo Port Liquefied Natural Gas Deepwater Port Draft EIS/EIR for the City of Oxnard.
- Preparation of the emission estimates used in the Air Quality Sections for the DWR Tehachapi Second Afterbay Project Initial Study and EIR.

Camp Dresser & McKee, Inc.

1998 to 2000

Mr. Walters was responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- Preparation of emission inventories and dispersion modeling for criteria and air toxic pollutants for the Los Angeles International Airport Master Plan (LAXMP) EIS/EIR.
- Project Manager/Technical lead for the completion of air permit applications and air compliance audits for two Desa International fireplace accessory manufacturing facilities located in Santa Ana, California.
- Project manager/technical lead for the completion of Risk Management Plans (RMPs) for four J.R. Simplot food processing facilities in Oregon, Idaho, and Washington and the Consolidated Reprographics facility located in Irvine, California.

Planning Consultants Research

1997 to 1998

Mr. Walters was responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- Project Manager for a stationary source emission audit of the entire Los Angeles International Airport complex for Los Angeles World Airports (LAWA) in support of the LAXMP.
- Review of the Emission Dispersion Modeling System (EDMS) and preparation of a report with findings to the Federal Aviation Administration for LAWA in support of the LAXMP.
- Project manager for the ambient air monitoring and deposition monitoring studies performed for LAWA in support of the LAXMP, including the selection of the monitoring sites and specialty subcontractor, and review of all monitoring data.

Aspen Environmental Group/Clean Air Solutions

1995 to 1996

Mr. Walters was responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- Manager of the Portland, Oregon, office of Clean Air Solutions from March 1995 to December 1995, with responsibilities including Project Management, Business Development, and Administration.
- Control technology assessment, engineering support and Notice of Intent to construct preparation for J.R. Simplot's Hermiston, Oregon, food processing facility. Review and revision of an Air Contaminant Discharge Permit application, Title V permit application, and PSD modeling analysis for J.R. Simplot's Hermiston facility.

- Air quality compliance report including an air emission inventory, regulation and permit compliance determination, and recommendations for compliance for Lumber Tech, Inc.'s Lebanon, Oregon, wood products facility.

Fluor Daniel, Inc.

1990 to 1995 and 1996 to 1997

Mr. Walters was responsible as lead technical or project manager for major environmental projects for both government and private clients. His projects included:

- Prepared several air permit applications for the ARCO Los Angeles Refinery Polypropylene Plant Project; Phase I environmental assessments for properties located in Southern California; and a site investigation and RCRA closure plan for a hazardous waste storage site in Vernon, California.
- Project manager of the Anaconda Smelter site for the U.S. Environmental Protection Agency's (EPA) Alternative Remedial Contract System (ARCS) project during the conclusion of technical activities and project closeout. Prepared a cost recovery report for the project.
- Performed environmental analysis for the Bonneville Power Authority, including air pollution BACT analysis, wastewater analysis, and evaluation of secondary environmental effects of electric power producing technologies.

Jacobs Engineering Group

1988 to 1990

Mr. Walters was responsible for a wide range of air pollution regulatory and testing projects, including the following:

- Project manager of air toxic emission inventory reports prepared for U.S. Borax's boron mining and refining facility and the Naval Aviation Depot (N. Island Naval Base, San Diego, California).
- Prepared air permit applications and regulatory correspondence for several facilities including the U.S. Department of Energy's Feed Material Production Center uranium processing facility in Fernald, Ohio; Evaluation of a sludge dewatering process at Unocal's Wilmington, California, Refinery; and United Airlines blade repair facility at the San Francisco Airport.
- Characterized and quantified air emissions for offshore oil and gas development activities associated with Federal oil and gas Lease Sale 95, offshore southern California, for the U.S. Minerals Management Service.

CERTIFICATIONS

- Chemical Engineer, California License 5973
- CARB, Fundamentals of Enforcement Seminar
- EPA Methods 1-8, 17; Training Seminar

AWARDS

- California Energy Commission Outstanding Performance Award 2001

DECLARATION OF Richard L. Anderson

I, **Richard L. Anderson**, declare as follows:

1. I am presently under contract with Aspen Environmental Group to provide environmental technical assistance to the California Energy Commission. Under Contract No. 700-05-002, I am serving as a Biological Resource Specialist to provide Peak Workload Support for the Energy Facility Siting Program and for the Energy Planning Program.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I assisted Staff in the analysis of **Biological Resources** for the **Solar Millennium Ridgecrest Project**, and helped to prepare testimony based on my independent analysis of the Application for Certification and supplements hereto, field surveys of the proposed site, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: March 18, 2010 Signed: Original signed by R. Anderson

At: Davis, California

RICHARD L. ANDERSON

2850 Layton Dr.
Davis, CA 95616
530.758.4672
Danderson@cal.net

EDUCATION

1976 B.S. Biological Sciences, University of California at Davis

EXPERIENCE

March 2005 - Present Biological Resources, water Resources and soil resources consulting related to energy production.

March 2001 – March 2005 Energy Facilities Siting Planner III---Supervised the Biology, Water, and Soil Resources Unit of the Systems Assessment and Facilities Siting Division of the California Energy Commission. Responsible for biology, water, and soil staff and related products regarding energy planning, policy, and siting.

August 1979 - March 2001 Planner I and Planner II---Staff Biologist, California Energy Commission

Develop and review planning and policy objectives for California's energy facility siting program. Work on interdisciplinary teams responsible for review and preparation of Environmental Impact Reports, environmental planning projects, and locational analyses. Provide expert testimony in the area of biological resources. Act as project manager and contract manager for field research. Organize and direct workshops. Survey existing and proposed energy facility sites. Coordinate biological resource issue evaluation and mitigation planning with Federal, State; and local agencies and other interested parties. Managed several complex multi-year research projects.

October 1977-
July 1979 Environmental Specialist II, California State Water Resources Control Board
Responsible for environmental documents produced in the Division of Water Right's application unit. Analyzed and evaluated impacts of direct diversion and/or water storage (reservoir) on the environment. Coordinated and communicated with other State, Federal and local agencies, and the general public. Trained new employees.

PROFESSIONAL AFFILIATIONS/ CERTIFICATION

Raptor Research Foundation
The Wildlife Society---Certified Wildlife Biologist, TWS
American Ornithological Union
Coopers Society
American Field Ornithologists
Swainson's Hawk Technical Advisory Committee
International Erosion Control Association
National Wind Coordinating Committee

PUBLICATIONS

Author of numerous staff biological and water resources testimonies for the California Energy Commission of energy projects throughout the state including desert projects to marine biology and water quality issues associated with once-through cooling power plants. Author of numerous environmental assessments for water diversion and impoundment projects. Author of numerous reports and papers regarding conservation of T&E species, wind energy/bird interactions, and standard metrics and methods for monitoring bird interactions with wind turbines/utility structures.

DECLARATION OF David Bise

I, **David Bise**, declare as follows:

1. I am presently employed by the California Energy Commission in the **Environmental Protection Office** of the **Energy Facilities Siting Division** as a **Planner II**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff testimony on **Biological Resources** for the Ridgecrest Solar Power Project based on my independent analysis of the application and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: March 15, 2010 Signed: Original signed by D. Bise

At: Sacramento, California

David Bise

Education

University of California at Berkeley

M.S. Wildland Resource Science with emphasis in wildlife management, 1998

Thesis: “Vertebrate-Habitat Relationships in Sierra Nevada Mixed Conifer Forest”

University of California at Davis

B.S. Zoology, Psychology minor, 1992

Relevant Experience

PLANNER II

California Energy Commission, Sacramento, California December 2009 to present

Duties include preparation of biological analyses in power plant siting cases, reviewing environmental compliance, and construction and compliance monitoring on construction sites and during plant operations.

SENIOR BIOLOGIST

Foothill Associates, Rocklin, California March 2004 to December 2009

Duties included conducting biological constraints analyses, project management, budget preparation, focused special-status wildlife and plant surveys, wetland delineations, and tree surveys. Work products that I prepare include biological resource assessments, tree survey reports, tree mitigation monitoring plans, wetland delineations, EIR/EIS biology sections, project mitigation monitoring plans, initial studies, and Section 7 biological assessments. Work area includes Sierras, Bay Area, and greater Sacramento area as well as some project work in southern California. I also prepare summary reports for the U.S. Fish and Wildlife Service for focused survey work that I perform under my survey permits.

As a senior biologist, I currently mentor 3 biology staff members and peer review biological documentation prepared by junior biologists. Work duties also include budgets, scopes and schedules for new project work, workload management for junior staff, project coordination and scheduling, conducting client, agency, and general public meetings, and various marketing tasks including attending marketing meetings on behalf of the biology division and conducting marketing and proposal interviews.

WILDLIFE BIOLOGIST

Sapphos Environmental Inc., Pasadena, California February 2002 to September 2003

Duties included conducting focused wildlife and plant surveys, performing biological assessments, vegetation community mapping, project management and project budget preparation, and mentoring junior staff. Work products prepared included CEQA/NEPA documents such as EIRs, EISs, BAs, and biological technical reports. I also performed project management and budget preparation for a variety of large and small biological tasks. I also prepared summary reports for focused survey work that I performed under my survey permits. Work area included greater Los Angeles, Riverside, San Bernardino, and San Diego counties.

WILDLIFE BIOLOGIST

EDAW Earth and Environmental, San Diego, California March 2001 to January 2002

Duties included conducting focused special-status wildlife and plant surveys, biological site assessments and constraints analyses, vegetation community mapping, and preparation of

environmental documents such as biological assessments, biological constraints analyses, and focused survey reports.

ASSOCIATE BIOLOGIST

Ogden Environmental and Energy Services, San Diego, California April 1999 to March 2001

Duties included endangered species surveys, biological monitoring, construction monitoring, and pre-development surveys. I assisted in writing of biotechnical reports, environmental impact statements, and project proposals. I also performed project management work including preparation of project budgets and project scheduling.

PRIMARY BANDER

Upper Klamath Lake, Oregon September 1998 to October 1998

Duties included performing migration banding of passerine species for the Redwood Sciences Lab of the US Forest Service. Supervised and instructed volunteer banders. Required long hours in the field and some camping overnight for several days at a time. Work products included preparation of banding datasheets and summary banding reports.

WILDLIFE BIOLOGIST

Havasu National Wildlife Refuge Needles, California April 1998 to August 1998

Duties included performing nest searches for federally endangered southwestern willow flycatchers. Job involved extensive nest searching, point counts, banding of adults and juveniles, and vegetation mapping as well as surveying for associated resident and migratory bird species. Work products included survey reports and periodic nest status reports.

FIELD ASSISTANT

Barksdale AFB, Louisiana April 1997 to July 1997

Performed nest searches for resident and neo-tropical migrants in southern pine forests as well as extensive mist netting of resident and migrant birds in northwestern Louisiana. Required prior nest searching and mist-netting experience and ability to identify eastern bird species by sight and sound.

Memberships and Awards

- Member of national and western section of Wildlife Society
- Member of national and western section of International Society of Arboriculture
- USFWS approved biologist for Natomas Basin HCP surveys
- Nevada County, California approved biologist
- El Dorado County, California approved biologist
- Graduated with high honors from UC Davis and UC Berkeley

Special Skills

- Permitted with US Fish and Wildlife Service to survey for vernal pool invertebrates (fairy shrimp), coastal California gnatcatcher, least Bell's vireo, and southwestern willow flycatcher
- International Society of Arboriculture certified arborist
- Completed wetland delineation training course
- Permitted with the federal Bird Banding Laboratory
- Attended Wildlife Society red-legged frog workshop
- Attended Desert Tortoise Council training workshop
- Completed Bureau of Land Management flat-tailed horned lizard survey course
- Hold a scientific collecting permit with California Department of Fish and Game
- Completed fairy shrimp identification class
- Completed Arizona Department of Game and Fish willow flycatcher survey course (4/98)

DECLARATION OF Andrea Martine

I, **Andrea Martine**, declare as follows:

1. I am presently employed by the California Energy Commission in the **Environmental Protection Office** of the **Energy Facilities Siting Division** as a **Planner II**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepared the staff testimony on **Biological Resources** for the Ridgecrest Power Plant Project based on my independent analysis of the application and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 3/10/2010 Signed: Original signed by A. Martine

At: Sacramento, California

Andrea Martine

Employment History

California Energy Commission

Planner II, Staff Biologist

12/2009 to present

As a staff biologist with the Energy Commission, Ms. Martine analyzes the biological resource components of energy facilities siting applications to assess resource impacts, develop mitigation, and to evaluate compliance with applicable federal, state, and local, laws, ordinances, regulations, and standards. This requires working closely with biological resource protection and management agencies, subject matter experts, and Energy Commission consultants as well as with other Energy Commission staff to provide the best available information is included in staff analyses.

California Department of Transportation, District 3

Associate Environmental Planner/Environmental

11/1998 to 7/2000

Ms. Martine's primary duties with Caltrans as Project Biologist were to analyze environmental impacts to special status plants, wildlife and wetlands and stream associated with transportation projects in Northern California. She wrote environmental documents to satisfy CEQA, NEPA, obtained 404 permits, 401 certification and 1601 agreements for various transportation-related projects. She acted as liaison for Federal Highways Administration while reviewing documents prepared for local projects.

Jones & Stokes Associates, Inc.

Environmental Specialist/Botanist

04/1994 to 11/1998

While with the environmental consulting firm Jones & Stokes Assoc. Inc., Ms. Martine specialized in listed Brachiopod surveys, special status plant and floristic surveys. She worked throughout California including Sacramento, Placer, Fresno and San Diego counties and several military sites (BEALE AFB, Camp Roberts, & Fort Hunter Liggett). Projects while at JSA included protocol-level surveys for special-status plants and brachiopods, wetland delineations, and monitoring vernal pools, seasonal wetlands and riparian vegetation at mitigation sites. Managed brachiopod projects and budgets and writing biological resources sections of documents to satisfy NEPA and CEQA requirements.

El Dorado National Forest

Botanist (Volunteer)

07/1993 to 08/1993

Ms. Martine helped prepare environmental analyses of proposed timber and recreational projects in which, she produced inventories and assessments of the existing natural environmental conditions of project sites and watersheds.

EDUCATION

Biological Sciences

B.S.

California State University , Sacramento

June 1993

DECLARATION OF Joy Nishida

I, **Joy Nishida** declare as follows:

1. I am presently employed by the California Energy Commission in the **Biological Resources Unit** of the Siting, Transmission and Environmental Protection Division as a **Planner II**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff testimony on **Biological Resources** for the Ridgecrest Solar Power project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 3/18/10 Signed: Original signed by J. Nishida

At: Sacramento, California

JOY NISHIDA
Biologist

Experience Summary

Twenty-seven years experience in the biological field, including botanical consulting, curatorial management of vertebrate and herbarium collections, college-level instruction, and conducting biological resources impact analyses for inclusion in environmental documents.

Education

- California State Polytechnic University, Pomona—Master of Science, Biological Sciences
- California Polytechnic State University, San Luis Obispo—Bachelor of Science, Environmental & Systematic Biology and Natural Resources Management (Forestry Concentration)
- Certified Arborist — International Society of Arboriculture
No. WE-8078A, expires 12/31/10

Professional Experience

July 2008 to Present—Planner II: Siting, Transmission & Environmental Protection Division – California Energy Commission, Sacramento

As a staff biologist, primary duties include conducting impact analyses to biological resources for power plant siting projects. Other duties include evaluating compliance with accepted Conditions of Certification related to biological resource technical areas for power plant facilities and coordinating with biological resource protection and management agencies, environmental organizations, universities, and special interest groups to assure their biological input into Commission programs.

January 2008 to July 2008—Environmental Scientist: Regional Programs Unit, Division of Financial Assistance – State Water Resources Control Board, Sacramento

Using scientific judgment, provided technical and administrative review of environmental documents for projects receiving financial assistance from the State Water Board. Reviewed and commented on environmental documents for wastewater treatment and water reclamation facilities, watershed protection, nonpoint source pollution control, and other local assistance projects to assure compliance with the California Environmental Quality Act and other Division's environmental review process. Participated in applicant meetings, prepared Agenda and Resolution language for various projects seeking local funding assistance from the State Water Board, developed environmental review summaries of projects to be funded, initiated consultation with federal authorities, developed mitigation measures, and resolved environmental concerns related to proposed projects. Coordinated interagency review of environmental documents subject to crosscutting federal regulations, and organized and maintained the Environmental Services filing system, library, and database.

April 2005 to January 2008—Botanist, Wetland Ecologist, and Certified Arborist - Jones & Stokes, Sacramento

Organized and conducted general plant surveys and directed plant surveys for special-status plant species, vegetation mapping, arborist surveys, and wetland delineations extensively throughout California. Wrote wetland delineation reports, arborist reports, and biological resource sections for the following environmental documents: Environmental Impact Reports, Environmental Impact Statements, Natural Environment Studies, Initial Studies, and Biological Analyses for listed species. Dealt with the legal requirements regarding the protection of biological resources and developed mitigation to prevent significant impacts. Coordinated the efforts of sub-consultants, clients, and coworkers in the development of environmental documents.

1990-2005—Botanical Consultant – Nishida Botanical Consulting

Worked as an independent contractor to consulting firms, educational facilities, and federal agencies. Duties included organizing and conducting floral inventories, directed searches for special-status plant species, vegetation mapping, monitoring revegetation sites, assisting in wetland delineations, and analyzing impacts on botanical resources.

1990-1996—Instructional Support Technician– California State University, Northridge

As a collections manager for the Department of Biology Herbarium and Vertebrate Collections, responsibilities included the acquisition, preparation, curation, and reorganization of the teaching and research collections. Implemented a database for the vertebrate collections. Recruited and supervised volunteers to assist in the collections. Also supervised graduate students. Other duties included instructional assistance with Botany and Vertebrate classes in the lab and in the field.

1987-1989—Biological Sciences Department Part-time Lecturer– California State Polytechnic University, Pomona

Taught and prepared majors and non-majors freshman level Biology labs.

DECLARATION OF Glenn J. Farris

I, **Glenn J. Farris**, declare as follows:

1. I am presently employed as a subcontractor to Aspen Environmental Group, a contractor to the California Energy Commission, **Siting, Transmission, and Environmental Protection Division**, as a cultural resources technical specialist.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I assisted in the preparation of the staff testimony on **Cultural Resources** for the Ridgecrest Solar Power Project, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: March 17, 2010 Signed: Original signed by G. Farris

At: Sacramento, California

CURRICULUM VITAE

NAME: GLENN J. FARRIS

PLACE OF BIRTH: Fort Benning, Georgia

WORK ADDRESS: 508 Second Street, Suite 108
Davis, CA 95616

HOME ADDRESS: 2425 Elendil Lane
Davis, CA 95616

TELEPHONE: (530) 756-1497 (OFFICE)

E-MAIL: gfarris@omsoft.com

EDUCATION:

M.A. (1979), Ph.D. (1982), (Anthropology) University of California, Davis, CA.

CURRENT EMPLOYMENT:

Partner, Farris, West & Schulz, Archaeological Consultants: Historic Archaeology, Ethnohistory, and Prehistoric Archaeology.

RECENT PAST EMPLOYMENT:

Senior State Archeologist (Retired), Archaeology, History and Museums Division, and Supervisor, State Archaeological Collections Research Facility (SACRF), Department of Parks and Recreation, Sacramento, CA. I worked for DPR starting on April 1, 1978 and retired on April 2, 2008. This position has involved archaeological fieldwork and research throughout the state of California on sites from Eureka to San Diego. I have had a special interest in sites at Fort Ross, Sonoma, La Purisima Mission, Santa Barbara Presidio, Santa Cruz, San Pasqual (San Diego County), and Old Town San Diego covering prehistoric and historic sites.

PREVIOUS EXPERIENCE:

- 1976 Archaeological excavation and survey at Lake Berryessa with Dr. Martin Baumhoff and Dr. Delbert True.
- 1977 Excavation at Cooper-Molera Adobe, Monterey, CA. Working for Dr. Robert F. Heizer on historical project.
- 1978 Archaeological Survey on Mendocino National Forest (Summer seasonal work), Corning District.
- 1979 Seasonal Archeological Project Leader, California Department of Parks and Recreation. Excavation project at Sonoma Barracks, Sonoma, CA.
- 1980 Seasonal Archeological Project Leader, California Department of Parks and Recreation. Archeological surveys in Jackson State Forest and Mountain Home State Forest.
- 1980 Archaeologist, GS-7, U.S. Forest Service. Seasonal archaeological survey leader on Lassen National Forest, east of Mount Lassen.

ELECTED AND APPOINTED POSITIONS HELD:

1. General Chairperson, SHA/CUA Annual Meetings, Sacramento, CA. 1986.
2. Northern Vice-President, Society for California Archaeology. 1987-1989.
3. President, Central California Archaeological Foundation, 1987-1989
4. Board Member, Society for Historical Archaeology, 1988-1992.
5. Associate Editor, Historical Archaeology. 1988--2008.
6. Research Associate, University of California Archaeological Research Facility,

- Berkeley. 1990-Present.
7. Board Member, California Mission Studies Association, 1994 - 1996. Publications Committee Chair 1994 -2001.
 8. Reviews Editor. Journal of California and Great Basin Anthropology. 1994-Present.
 9. Research Associate, Santa Barbara Museum of Natural History, Santa Barbara, CA. December 1995-Present.
 10. President, Society for Historical Archaeology (1996 - 1997).
 11. Editor, CMSA Occasional Papers, 2000--2003.
 12. Corresponding Secretary, Fort Ross Interpretive Association. 2008-Present.

MILITARY SERVICE:

Captain, U.S. Army Intelligence. July 10, 1966-July 9, 1969. Overseas Service: Japan (16 months); Vietnam (14 months). Awards: ARCOM w/1 Oak Leaf Cluster; Bronze Star Medal w/2 OLC.

FEDERAL CIVIL SERVICE:

Special Agent (Criminal Investigator) GS-11 for the Office of the Inspector General, U.S. Department of Agriculture, San Francisco. September 1972-September 1975. Spent two months in training as a law enforcement officer in Washington, DC (training program run by the Treasury Department). Worked with the U.S. Attorney's offices in various western states in bringing legal cases to trial.

AWARDS:

Campbell Menefee Scholastic Award for 1992. Given by the Sonoma County Historical Society for historical research in Sonoma County history leading to publication, Santa Rosa, CA. January 23, 1993.

Institute of History (San Diego Historical Society), Native American History Award, April 24, 1993, Sponsored by the Rancho Santa Fe Historical Society in recognition of the "Year of the American Indian, 1992."

Martin A. Baumhoff Special Award, Society for California Archaeology, Modesto, CA, March 24, 2001.

REPORTS AND PUBLICATIONS AND PAPERS:

Over 100 publications and reports.
90 formal presentations

DECLARATION OF

Michael D. McGuirt

I, **Michael D. McGuirt**, declare as follows:

1. I am presently employed by the California Energy Commission in the **Environmental Protection Office** of the **Siting, Transmission and Environmental Protection Division** as a **Planner III**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff testimony on **Cultural Resources** for the **Solar Millenium Ridgecrest Solar Power** project based on my independent analysis of the application and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 3/19/10 Signed: Original signed by M. McGuirt

At: Sacramento, California

MICHAEL D. MCGUIRT, MA, RPA

SUMMARY OF PROFESSIONAL EXPERIENCE

Fifteen years of professional academic and cultural resources management experience in western North America, Hawai'i, Central America, and Eastern Europe. Former regulator and present planner with expert knowledge of Section 106 of the National Historic Preservation Act of 1966 (NHPA). Thorough knowledge of the California Environmental Quality Act of 1970, Section 110 of the NHPA, and the US Army Corps of Engineers' Appendix C. Working knowledge of the National Environmental Policy Act of 1969, Native American Graves Protection and Repatriation Act of 1990, and the Archaeological Resources Protection Act of 1979. Expert in developing and coordinating historic preservation solutions that comply with complex Federal, state, and local regulatory environments for large energy, transportation, and telecommunications projects. Expert technical skills in geoarchaeology, mapping and spatial analysis, archaeological survey and excavation, and material culture analysis.

EDUCATION

MASTER OF ARTS, Anthropology, University of Texas at Austin
May 1996

BACHELOR OF ARTS, Anthropology and Archaeological Studies, University of Texas at Austin
December 1990

PROFESSIONAL AFFILIATIONS

Register of Professional Archaeologists
Society for American Archaeology
Society for California Archaeology
National Trust for Historic Preservation
California Preservation Foundation

HONORARY AFFILIATIONS

Honor Society of Phi Kappa Phi

RECENT PROFESSIONAL EMPLOYMENT

ENERGY PLANNER III, California Energy Commission, Sacramento, California
December 2009 to present

Supervise an Energy Commission staff of five professional cultural resources analysts and a varying number of equivalent consultants in the development of CEQA and NEPA analyses of the potential effects that the construction and operation of proposed thermal power plants may have on significant cultural resources, develop and supervise the implementation of agency-wide programs to facilitate agency compliance with Federal historic preservation regulations, and supervise the periodic staff reviews of licensees' actions to ensure compliance with conditions of certification for extant licenses.

ENERGY PLANNER II, California Energy Commission, Sacramento, California
November 2007 to December 2009

Develop environmental impact analyses of the potential effects that the construction and operation of proposed thermal power plants may have on significant cultural resources. Apply applicable Federal, State, and local statutes and regulations, as they relate to the consideration of cultural resources. Design and execute cultural resource impact analyses that are appropriate to the specific regulatory context for each proposed project. Gather and evaluate information on projects and on cultural resources in project areas. Develop and maintain agency and public relationships to acquire the most useful data and to elicit input in the development of California Energy Commission conditions of certification. Succinctly convey, orally in different public forums and in different written technical formats, the results of cultural resource impact analyses and proposed conditions of certifications meant to mitigate adverse impacts to significant cultural resources. Periodic reviews of licensees' actions to ensure compliance with extant conditions of certification. Oversight of consultants' who are preparing cultural resource impact analyses.

ASSOCIATE STATE ARCHAEOLOGIST, Office of Historic Preservation, California Department of Parks and Recreation (California State Parks), Sacramento, California
May 2001 to November 2007

Regulator, in the California Office of Historic Preservation (OHP), of the Advisory Council on Historic Preservation's (Advisory Council) process implementing Section 106 of the National Historic Preservation Act (NHPA). Conducted among the most complex Section 106 reviews, and participated in, and often guided, the consultations of which those reviews were a part. Formally advised other OHP units and the California State Historical Resources Commission on the appropriate disposition and treatment of archaeological resources in the context of other State and Federal historic preservation programs that OHP either administers or in which OHP participates. Worked out of class for two consecutive, six-month terms as a Senior State Archeologist, from December 2004 through December 2005, supervising the Project Review Unit for the State Historic Preservation Officer (SHPO). As the Acting Chief of Project Review, managed and trained a staff of eight professionals and one clerical assistant to conduct, on behalf of the SHPO, the review of all Federal agency actions in the State of California under 36 CFR Part 800, the Advisory Council's Section 106 regulation.

ENVIRONMENTAL SPECIALIST III, Jones & Stokes, Sacramento, California
February 1999 to May 2001

Designed, conducted, and managed short- and long-term archaeological projects in California, Nevada, and New Mexico to comply with Sections 106 and 110 of the NHPA. Prepared proposals. Assisted with client contract negotiations. Conducted archaeological record searches and archival research. Directed Phase I pedestrian inventory surveys and test excavations for Phase II evaluations. Analyzed material culture assemblages. Prepared technical reports and regulatory compliance documents including National Register property and district evaluations, and monitoring and discovery plans. Represented clients in consultations with federal and state agencies, and coordinated and managed clients' compliance with federal cultural resource

regulations and the cultural resource regulations of California, Nevada, and New Mexico.

ASSISTANT ANTHROPOLOGIST, Bernice Pauahi Bishop Museum, Honolulu, Hawai'i
August 1996 to June 1998

Assisted with archaeological project design, preparation of proposals, and client contract negotiations, directed Phase I pedestrian inventory surveys, test excavations for Phase I subsurface inventory surveys, test excavations for property evaluations, and data recovery excavations, and assisted with preparation of technical reports on short-term cultural resource management contracts. Analyzed field records, prepared site reports and synthetic report chapters, and analyzed and prepared reports on lithic assemblages for Phases I–III of a long-term federal highway project (Interstate Route H–3). Conducted research in Hawaiian archaeology, and delivered public and professional presentations of that research. Advised on the integration of geoarchaeological methods and techniques into cultural resource management field efforts, and on geoarchaeological interpretations of extant field records, and designed and conducted geoarchaeological components of fieldwork for short-term cultural resource management contracts.

RECENT PROFESSIONAL DEVELOPMENT

CULTURAL RESOURCE AND ENVIRONMENTAL LAW

Successful CEQA Compliance: An Intensive Two-Day Seminar

Sacramento, California, University of California, Davis, Continuing and Professional Education, Terry Rivasplata and Maggie Townsley
June 2009

ACHP - FHWA Advanced Seminar: Reaching Successful Outcomes in Section 106 Review

Vancouver, Washington, Advisory Council on Historic Preservation, Don Klima and Carol Legard; Federal Highway Administration, Mary Ann Naber
October 2007

NEPA Compliance and Cultural Resources

Portland, Oregon, National Preservation Institute, Joe Trnka
October 2007

Section 106: How to Negotiate and Write Agreements

Sacramento, California, National Preservation Institute, Claudia Nissley
November 2004

Consultation with Indian Tribes on Cultural Resource Issues

Sacramento, California, National Preservation Institute, Thomas F. King and Reba Fuller
September 2003

Section 106: How to Negotiate and Write Agreements

The Presidio, San Francisco, California, National Preservation Institute, Thomas F. King
May 2002

Introduction to CEQA

Sacramento, California, University of California, Davis, Continuing and Professional Education, Ken Bogdan and Terry Rivasplata
July 2000

TECHNICAL ARCHAEOLOGY

Introduction to Historic Site Survey, Preliminary Evaluation, and Artifact ID

West Sacramento, California, California Department of Transportation, Julia Huddleson, Anmarie Medin, Judy Tordoff, and Kimberly Wooten; California Department of Parks and Recreation, Glenn Farris, Larry Felton, and Pete Schulz
September 2006

Principles of Geoarchaeology for Transportation Projects (Course No. 100246)

Sacramento, California, California Department of Transportation, Graham Dalldorf, Glenn Gmoser, Jack Meyer, Stephen Norwick, Adrian Praetzellis, and William Silva
October 2006

INFORMATION TECHNOLOGY AND CULTURAL RESOURCE MANAGEMENT

GIS: Practical Applications for Cultural Resource Projects

Sacramento, California, National Preservation Institute, Deidre McCarthy
September 2006

RECENT PAPERS AND REPORTS

BASTIAN, BEVERLY E. AND MICHAEL D. MCGUIRT

2009 **Cultural Resources**. In *Final Staff Assessment, Canyon Power Plant, Application for Certification (07-AFC-9), Orange County* (CEC-700-2009-008-FSA, September 2009), edited by Siting, Transmission and Environmental Protection Division, California Energy Commission, pp. 4.3-1–4.3-51. Siting, Transmission and Environmental Protection Division, California Energy Commission, Sacramento. On file with the California Energy Commission, Sacramento.

BLOSSER, AMANDA, MICHAEL D. MCGUIRT, AND BEVERLY E. BASTIAN

2008 **Cultural Resources**. In *Staff Assessment, Orange Grove Project, Application for Certification (08-AFC-4), San Diego County* (CEC-700-2008-009, November 2008), edited by Siting, Transmission and Environmental Protection Division, California Energy Commission, pp. 4.3-1–4.3-43. Siting, Transmission and Environmental Protection Division, California Energy Commission, Sacramento. On file with the California Energy Commission, Sacramento.

DARCANGELO, JENNIFER, JOHN SHARP, MICHAEL D. MCGUIRT, ANDREA GALVIN, AND CLARENCE CAESAR

2004 **Section 106 for Experienced Practitioners: Consulting with the California SHPO (GEV4111)**. Course taught on 8 September 2004 in Oakland to California Department of Transportation cultural resources personnel and private sector cultural resource consultants (8 hours).

DARCANGELO, JENNIFER, JOHN SHARP, MICHAEL D. MCGUIRT, AND ANDREA GALVIN

2005 ***How to Consult with the California SHPO***. Workshop presented on 23 April 2005 at the 39th Annual Meeting of the Society for California Archaeology, Sacramento, California (6 hours).

JONES & STOKES

1999a ***Cultural Resource Inventory Report for Williams Communications, Inc. Fiber Optic Cable System Installation Project, Wendover, Nevada to the California State Line***. Volume 1: Draft Report. July. (JSA 98-358.) Sacramento, California. Prepared for Williams Communications, Inc., Tulsa, Oklahoma.

1999b ***Cultural Resources Report for the Williams Communications, Inc. Interstate 80 Fiber Optic Cable System Installation Project***. Volume I. September. (JSA 98-358.) Submitted to Williams Communications, Inc., Tulsa, Oklahoma. On file with the State Historic Preservation Office, Carson City, Nevada.

1999c ***Archaeological Site Avoidance and Monitoring Plans for Williams Communications' Fiber Optic Cable Installation In the Union Pacific Railroad Right-of-Way, Doña Ana County to Hidalgo County, New Mexico***. October. (JSA98-379.) Sacramento, California. Prepared for Williams Communications, Inc., Tulsa, Oklahoma.

2001 ***Final Phase II Cultural Resource Evaluation for the Kramer Mining District, Edwards AFB, Kern and San Bernardino Counties, California***. Volume I. November. Sacramento, California. On file with the Base Historic Preservation Officer, Edwards AFB, California.

LEBO, SUSAN A. AND MICHAEL D. MCGUIRT

1997 ***Geoarchaeology at 800 Nuuanu: Archaeological Inventory Survey of Site 50-80-14-5496 (TMK1-7-02:02), Honolulu, Hawai'i***. Department of Anthropology, Bishop Museum, Honolulu. (100 pp.) Submitted to Bank of Hawaii, Honolulu. On file with the State Historic Preservation Division, Honolulu.

1998a ***Assessments of Stone Architecture: a Case Study from North Hālawā Valley, O'ahu***. Paper presented at the 11th Annual Hawaiian Archaeology Conference of the Society for Hawaiian Archaeology, Kailua-Kona, Hawai'i.

1998b ***Pili Grass, Wood Frame, Brick, and Concrete: Archaeology at 800 Nuuanu***. Department of Anthropology, Bishop Museum, Honolulu. (142 pp.) Submitted to Bank of Hawaii, Honolulu. On file with the State Historic Preservation Division, Honolulu.

LENNSTROM, HEIDI A., P. CHRISTIAAN KLIEGER, MICHAEL D. MCGUIRT, AND SUSAN A. LEBO

1997 ***Archaeological Reconnaissance of Pouhala Marsh, Ewa District, O'ahu***. Department of Anthropology, Bishop Museum, Honolulu. (14 pp.) Submitted to Ducks

Unlimited, Inc., Rancho Cordova, California. On file with the State Historic Preservation Division, Honolulu.

MCGUIRT, MICHAEL D.

1996 ***The Geoarchaeology and Palynology of an Early Formative Pithouse Village in West-Central New Mexico.*** Unpublished M.A. thesis, Department of Anthropology, University of Texas at Austin.

1998 **50-80-10-2010, 50-80-10-2016, 50-80-10-2088, and 50-80-10-2134.** In *Activities and Settlement in an Upper Valley: Data Recovery and Monitoring Archaeology in North Hālawā Valley, Oʻahu*, vols. 2a and 2b, edited by Department of Anthropology, Bishop Museum, pp. 1–3, 1–44, 1–5, and 1–46. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

2002 **Committee Reports, OHP Liaison.** *SCA Newsletter* 36(3):4–5.

2004 **Committee Reports, OHP Liaison.** *SCA Newsletter* 38(2):7, 38(3):6–8.

2006 **Preservation Archaeology.** In *California Statewide Historic Preservation Plan: 2006–2010*, edited by Marie Nelson, pp. 8–15. California Department of Parks and Recreation's Office of Historic Preservation, Sacramento. Submitted to the National Park Service, Washington, D.C. On file at the California Office of Historic Preservation, Sacramento.

2008 **Dealing with Multi-element Cultural Resources under Section 106.** In *Historic Properties Are More Than Meets the Eye: Dealing with Historical Archaeological Resources under the Regulatory Context of Section 106 and CEQA*. Session presented on 25 April 2008 at the 33rd Annual California Preservation Conference of the California Preservation Foundation in Napa, California, moderated by Michelle Messinger and Michael D. McGuirt (1 1/2 hours).

MCGUIRT, MICHAEL D., AMANDA BLOSSER, AND BEVERLY E. BASTIAN

2009 **Cultural Resources.** In *Final Staff Assessment, Beacon Solar Energy Project, Application for Certification (08-AFC-2), Kern County* (CEC-700-2009-005-FSA, August 2009), edited by Siting, Transmission and Environmental Protection Division, California Energy Commission, pp. 4.3-1–4.3-131. Siting, Transmission and Environmental Protection Division, California Energy Commission, Sacramento. On file with the California Energy Commission, Sacramento.

MCGUIRT, MICHAEL D. AND LESLIE H. HARTZELL

1997 **50-80-10-2139 and 50-80-10-2459.** In *Imu, Adzes, and Upland Agriculture: Inventory Survey Archaeology in North Hālawā Valley, Oʻahu*, vols. 2c and 2d, edited by Department of Anthropology, Bishop Museum, pp. 1–17 and 1–5. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

1998 **Chapter 1: Introduction.** In *Activities and Settlement in an Upper Valley: Data Recovery and Monitoring Archaeology in North Hālawā Valley, O`ahu*, vol. 1, edited by Department of Anthropology, Bishop Museum, pp. 1–14. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

MCGUIRT, MICHAEL D. AND SHANNON P. MACPHERRON

1998 **50-80-10-2137.** In *Activities and Settlement in an Upper Valley: Data Recovery and Monitoring Archaeology in North Hālawā Valley, O`ahu*, vol. 2b, edited by Department of Anthropology, Bishop Museum, pp. 1–86. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

MCGUIRT, MICHAEL AND SARAH C. MURRAY

2008 **Cultural Resources.** In *Preliminary Staff Assessment, Ivanpah Solar Electric Generating System, Application for Certification (07-AFC-5), San Bernardino County* (CEC-700-2008-013-PSA, December 2008), edited by Siting, Transmission and Environmental Protection Division, California Energy Commission, pp. 5.3-1–5.3-73. Siting, Transmission and Environmental Protection Division, California Energy Commission, Sacramento. On file with the California Energy Commission, Sacramento.

MCGUIRT, MICHAEL D. AND DEBORAH I. OLSZEWSKI

1997 **50-80-10-2256.** In *Imu, Adzes, and Upland Agriculture: Inventory Survey Archaeology in North Hālawā Valley, O`ahu*, vol. 2d, edited by Department of Anthropology, Bishop Museum, pp. 1–9. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

MIKESELL, STEPHEN, MICHAEL MCGUIRT, AND TRISH FERNANDEZ

2007 **Introduction to the White Papers in State Historical Resources Commission Archaeology Committee White Papers.** *SCA Newsletter* 41(1):18–21.

SHARP, JOHN, MICHAEL D. MCGUIRT, JENNIFER DARCANGELO, AND ANDREA GALVIN

2004 **How to Consult with the California SHPO.** Workshop presented on 18 March 2004 at the 38th Annual Meeting of the Society for California Archaeology, Riverside, California (4 hours).

DECLARATION OF

Alvin J. Greenberg, Ph.D.

I, **Alvin J. Greenberg, Ph.D.** declare as follows:

1. I am presently a consultant to the California Energy Commission, Energy Facilities Siting and Environmental Protection Division.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff testimony on the **Public Health, Hazardous Materials Management, and Worker Safety/Fire Protection** sections for the **Ridgecrest Solar Power Project Application** based on my independent analysis of the amendment petition, supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: February 8, 2010

Signed: Original signed by A. Greenberg

At: Sacramento, California

Risk Science Associates

121 Paul Dr., Suite A, San Rafael, Ca. 94903-2047

415-479-7560 fax 415-479-7563

e-mail agreenberg@risksci.com

Name & Title:

Alvin J. Greenberg, Ph.D., FAIC, REA, QEP
Principal Toxicologist

Dr. Greenberg has had over two decades of complete technical and administrative responsibility as a team leader in the preparation of human and ecological risk assessments, air quality assessments, hazardous materials handling and risk management/prevention, infrastructure vulnerability assessments, occupational safety and health, hazardous waste site characterization, interaction with regulatory agencies in obtaining permits, and conducting lead surveys and studies. He has particular expertise in the assessment of dioxins, lead, diesel exhaust, petroleum hydrocarbons, mercury, the intrusion of subsurface contaminants into indoor air, and the preparation and review of public health/public safety sections of EIRs/EISs. Dr. Greenberg's expertise in risk assessment has led to his appointment as a member of several state and federal advisory committees, including the California EPA Advisory Committee on Stochastic Risk Assessment Methods, the US EPA Workgroup on Cumulative Risk Assessment, the Cal/EPA Peer Review Committee of the Health Risks of Using Ethanol in Reformulated Gasoline, the California Air Resources Board Advisory Committee on Diesel Emissions, the Cal/EPA Department of Toxic Substances Control Program Review Committee, and the DTSC Integrated Site Mitigation Committee. Dr. Greenberg is the former Chair of the Bay Area Air Quality Management District Hearing Board, a former member of the State of California Occupational Health and Safety Standards Board (appointed by the Governor), and former Assistant Deputy Chief for Health, California OSHA. And, since the events of 9/11, Dr. Greenberg has been the lead person for developing vulnerability assessments, power plant security programs, and conducting safety and security audits of power plants for the California Energy Commission and has assisted the CEC in the assessment of safety and security issues for proposed LNG terminals. In addition to providing security expertise to the State of California, Dr. Greenberg was the Team Leader and main consultant to the State of Hawaii on the updating of their Energy Emergency Preparedness Plan.

Years Experience: 26

Education:

B.S. 1969 Chemistry, University of Illinois Urbana

Ph.D. 1976 Pharmaceutical/Medicinal Chemistry, University of California, San Francisco

Postdoctoral Fellowship 1976-1979 Pharmacology/Toxicology, University of California, San Francisco

Postgraduate Training 1980 Inhalation Toxicology, Lovelace Inhalation Toxicology Research Institute, Albuquerque, NM

Professional Registrations:

Board Certified as a Qualified Environmental Professional (QEP)
California Registered Environmental Assessor - I (REA)
Fellow of the American Institute of Chemists (FAIC)

Professional Affiliations:

Society for Risk Analysis
Air and Waste Management Association
American Chemical Society
American Association for the Advancement of Science
National Fire Protection Association

Technical Boards and Committee Memberships - Present:

Squaw Valley Technical Review Committee
(appointed 1986)

Technical Boards and Committee Memberships - Past:

July 1996 – March 2002

Member, Bay Area Air Quality Management District Hearing Board
(Chairman 1999-2002)

September 2000 – February 2001

Member, State Water Resources Control Board Noncompliant Underground
Tanks Advisory Group

January 1999 – June 2001

Member, California Air Resources Board Advisory Committee on Diesel
Emissions

January 1994 - September 1999

Vice-Chairman, State Water Resources Control Board Bay Protection and Toxic
Cleanup Program Advisory Committee

September 1998

Member, US EPA Workgroup on Cumulative Risk Assessment

April 1997 - September 1997

Member, Cal/EPA Private Site Manager Advisory Committee

January 1986 - July 1996

Member, Bay Area Air Quality Management District Advisory Council
(Chairman 1995-96)

January 1988 - June 1995

Member: California Department of Toxic Substance Control Site Mitigation
Program Advisory Group

January 1989 - February 1995

Member: Department of Toxics Substances Control Review Committee, Cal-EPA

October 1991 - February 1992

Chair: Pollution Prevention and Waste Management Planning Task Force of the
Department of Toxics Substances Control Review Committee, Cal-EPA

September 1990 - February 1991

Member: California Integrated Waste Management Board Sludge Advisory
Committee

September 1987 - September 1988

ABAG Advisory Committee on Regional Hazardous Waste Management Plan

March 1987 - September 1987

California Department of Health Services Advisory Committee on County and
Regional Hazardous Waste Management Plans

January 1984 - October 1987

Member, San Francisco Hazardous Materials Advisory Committee

March 1984 - March 1987

Member, Lawrence Hall of Science Toxic Substances and Hazardous Materials
Education Project Advisory Board

Jan. 1, 1986 - June 1, 1986

Member, Solid Waste Advisory Committee, Governor's Task Force on Hazardous
Waste

Jan. 1, 1983 - June 30, 1985

Member, Contra Costa County Hazardous Waste Task Force

Sept. 1, 1982 - Feb. 1, 1983

Member, Scientific Panel to Address Public Health Concerns of Delta Water
Supplies, California Department of Water Resources

Present Position

January 1983- present

Owner and principal with Risk Sciences Associates, a Marin County, California,
environmental consulting company specializing in multi-media human health and
ecological risk assessment, air pathway analyses, hazardous materials management-
infrastructure security, environmental site assessments, review and evaluation of
EIRs/EISs, preparation of public health and safety sections of EIRs/EISs, and litigation
support for toxic substance exposure cases.

Previous Positions

Jan. 2, 1983 - June 12, 1984

Member, State of California Occupational Safety and Health Standards Board
(Cal/OSHA), appointed by the Governor

Aug. 1, 1979 - Jan. 2, 1983

Assistant Deputy Chief for Health, California Occupational Safety and Health
Administration

Feb. 1, 1979 - Aug. 1, 1979

Administrative Assistant to Chairperson of Finance Committee, Board of Supervisors, San Francisco

Jan. 1, 1976 - Feb. 1, 1979

Research Pharmacologist and Postdoctoral Fellow, Department of Pharmacology and Toxicology, School of Medicine, University of California, San Francisco

Jan. 1, 1975 - Dec. 31, 1975

Acting Assistant Professor, Department of Pharmaceutical Chemistry, University of California, San Francisco

Experience

General

Dr. Greenberg has been a consultant in Hazardous Materials Management and Security, Human and Ecological Risk Assessment, Occupational Health, Toxicology, Hazardous Waste Site Characterization, and Toxic Substances Control Policy for over 26 years. He has broad experience in the identification, evaluation and control of health and environmental hazards due to exposure to toxic substances. His experience includes Community Relations Support and Risk Communication through experience at high-profile sites and presentations at professional society meetings.

He has considerable experience in the review and evaluation of exposure via the air pathway - particularly to emissions from power plants, refineries, and diesel exhaust - and a thorough knowledge of the regulatory requirements through his experience at Cal/OSHA, the BAAQMD Hearing Board, as a consultant to the California Energy Commission, and in preparing such assessments for local government and industry. He has assessed exposures to diesel exhaust during construction and operations of stationary and mobile sources and has testified at evidentiary hearings numerous times on this subject.

He is presently assisting the California Energy Commission in assessing the risks to workers and the public of proposed power plants and LNG terminals in the state. His experience in hazard identification, exposure assessment, risk assessment, occupational safety and health, emergency response, and Critical Infrastructure Protection has made him a valuable part of the CEC team addressing this issue. He has reviewed and commented on the DEIS/DEIR for the proposed SES LNG Port of Long Beach terminal, focusing on security issues for the CEC and on safety matters for the City of Long Beach. He has presented technical information and analysis to the State of California Interagency LNG Working Group on thermal radiation public exposure criteria and safety/security at an east coast urban LNG terminal. (Both presentations are confidential owing to the nature of the material.) He has conducted numerous evaluations of the safety and hazards of natural gas pipelines for the CEC and has presented his findings and recommendations at public meetings and evidentiary hearings.

He served for over five years as the Vice-chair of the California State Water Resources Control Board Advisory Committee convened to address toxic substances in sediments in bays, rivers, and estuaries. He has been a member of the Squaw Valley Technical Review Committee since 1986 establishing chemical application management plans at golf courses to protect surface and

groundwater quality. He has also conducted numerous ecological risk assessments and characterizations, including those for marine and terrestrial habitats.

Dr. Greenberg has extensive experience in data collection and preparation of human and ecological risk assessments on numerous military bases and industrial sites with Cal/EPA DTSC and RWQCB oversight. He has also been retained to provide technical services to the Cal/EPA Department of Toxic Substances Control (preparation of human health risk assessments) and the Office of Environmental Health Hazard Assessment (review and evaluation of air toxics health risk assessments and preparation of profiles describing the acute and chronic toxicity of toxic air contaminants). He has also conducted several surveys of sites containing significant lead contamination from various sources including lead-based paint, evaluated potential occupational exposure to lead dust and fumes in industrial settings, prepared numerous human health risk assessments of lead exposure, and prepared safety and health plans for remedial investigation of lead contaminated soils. Dr. Greenberg is also a recognized expert on the requirements of California's Proposition 65 and has served as an expert on Prop. 65 litigation.

Sites with EPA, RWQCB and/or DTSC Oversight

Dr. Greenberg has specific experience in assessing human health and ecological risks at contaminated sites at the land/water interface, including petroleum contaminants, metals, mercury, and VOCs at several locations in California including Oxnard, Richmond, Avila Beach, Mare Island Naval Shipyard, San Diego, Hollister, San Francisco, Hayward, Richmond, the Port of San Francisco, and numerous other locations. He has used Cal/EPA methods, US EPA methods, and ASTM Risk Based Corrective Action (RBCA) and Cal/Tox methodologies. He is extremely knowledgeable about SWRCB and SF Bay RWQCB regulations on underground storage tank sites and with ecological issues presented by contaminated sediments including sediment analysis, toxicity testing, tissue analysis, and sediment quality objectives. Dr. Greenberg served on the State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee from 1994 until the end of the program in 1999.

Dr. Greenberg experience on many of these contaminated sites has been as a consultant to local governments, state agencies, and citizen groups. He assisted the City and County of San Francisco in developing local ordinance requiring soil testing (Article 20, Maher ordinance) and hazardous materials use reporting (Article 21, Walker ordinance). He served as the City of San Rafael's consultant to provide independent review and evaluation of the site characterization and remedial action plan prepared for a former coal gasification site. He was a consultant to a citizen group in northern California regarding exposure and risks due to accidental releases from a petroleum refinery and assisted in the assessment of risks due to crude petroleum contamination of a southern California beach. He has prepared a number of risk assessments addressing crude petroleum, diesel and gasoline contamination, including coordinating site investigations, environmental monitoring, and health risk assessment for the County of San Luis Obispo regarding Avila Beach subsurface petroleum contamination. That high-profile project lasted for over one year and Dr. Greenberg managed a team of experts with a budget of \$750,000. Another high-profile project included the preparation of an extensive comprehensive human and ecological risk assessment for the Hawaii Office of Space Industry on rocket launch impacts and transportation/storage of rocket fuels at the southern end of the Big Island of Hawaii. Dr. Greenberg's risk assessments were part of the EIS for the project. Dr. Greenberg also worked on another high-profile project conducting Air Pathway Analysis of off-site and on-site impacts

from landfill gas constituents, including indoor and outdoor air measurements, air dispersion modeling, flux chamber investigations, and health risk assessment for the County of Santa Barbara. Dr. Greenberg has conducted RI/FS work, prepared health risk assessments, evaluated hazardous waste sites and hazardous materials use at numerous locations in California, Hawaii, Oregon, Minnesota, Michigan, and New York. He has considerable experience in the development of clean-up standards and the development of quantitative risk assessments for site RI/FS work at CERCLA sites, as well as site closures, involving toxic substances and petroleum hydrocarbon wastes. He is experienced in working with both Region IX EPA and the State of California DTSC in negotiating clean-up standards based on the application of both site-specific and non site-specific health and ecological based clean-up criteria. He has significant experience in the development of site chemicals of concern list, quantitative data quality levels, site remedial design, the site closure process, the design and execution of data quality programs and verification of data quality prior to its use in the decision making process on large NPL sites.

Examples

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)

The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Health Risk Assessment and Air Pathway Analysis for the Ballard Canyon Landfill, Santa Barbara County, Ca. (March 1999)

Screening Human Health Risk Assessment, Calculation of Soil Clean-up Levels, and Aquatic Ecological Screening Evaluation, Galilee Harbor, Sausalito, Ca. (May 1998)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

Health Risk Assessment for Residual Mercury at the Deer Creek Facility, 3475 Deer Creek Road, Palo Alto, California. (July 1997)

Phase 2 Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (February 1997)

Human Health Risk Assessment, Teledyne Ryan Aeronautical, McCormick Selph Ordnance. Hollister, California. (December 1996)

Initial Phase Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (October 1996)

Human Health Risk Assessment, Ecological Screening Evaluation, and Development of Proposed Remediation Goals for the Flair Custom Cleaners Site, Chico, California (January 1996)

Human Health Risk Assessment for the X-3 Extrudate Project at Criterion Catalyst, Pittsburg, Ca. (November 1994)

Screening Health Risk Assessment and Development of Proposed Soil Remediation Levels at Hercules Plant #3, Culver City, Ca. (July 1993)

Ecological Screening Evaluation for the Altamont Landfill, Alameda County, Ca. (June, 1993)

Focused Ecological Risk Characterization, Hawaiian Electric Company, Keahole Generating Station Expansion, Hawaii (June 1993)

Human Health Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawaii Office of Space Industry (April 1993)

Ecological Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawaii Office of Space Industry (March 1993)

Human Health Risk Assessment for Current and Proposed Expanded Class II and Class III Operations at the Altamont Sanitary Landfill, Alameda County, Ca. (March, 1993)

Screening Health Risk Assessment for the Proposed Expansion of the West Marin Sanitary Landfill, Point Reyes Station, Ca. (March, 1993)

Health Risk Assessment for the Proposed Expansion of the Forward, Inc. Landfill, Stockton, Ca. (September 14, 1992)

Health Risk Assessment for the Rincon Point Park Project, San Francisco, Ca. Prepared for Baseline Environmental Consulting and the San Francisco Redevelopment Agency. (August 10, 1992)

Health Risk Assessment for the South Beach Park Project, San Francisco, Ca. Prepared for Baseline Environmental Consulting and the San Francisco Redevelopment Agency. (August 10, 1992)

Screening Health Risk Assessment and Development of Proposed Soil and Groundwater Remediation Levels, Kaiser Sand and Gravel, Mountain View, Ca. Prepared for Baseline Environmental Consulting (January 30, 1992)

Development of Proposed Soil Remediation Levels for the Marine Corps Air-Ground Combat Center, 29 Palms, California (May 30, 1991)

Preliminary Health Risk Assessment for the City of Pittsburg Redevelopment Agency, Pittsburg, California (May 29, 1991)

Military Bases

Dr. Greenberg has experience in conducting assessments at DOD facilities, including RI/FS work, preparation of health risk assessments, evaluation of hazardous waste sites and hazardous materials use at the following Navy sites in California: San Diego Naval Base; Marine Corps Air-Ground Combat Center, 29 Palms; Mare Island Naval Shipyard, Vallejo; Treasure Island Naval Station, San Francisco, Hunters Point Naval Shipyard, San Francisco, and the Marine

Corps Logistics Base, Barstow. He worked with the U.S. Navy and the U.S. EPA in the implementation of Data Quality Objectives (DQO's) at MCLB, Barstow.

Examples

Review and Evaluation of the Remedial Investigation Report and Human Health Risk Assessment for the U. S. Naval Station at Treasure Island, Ca. (June 1999)

Screening Health Risk Assessment for the Proposed San Francisco Police Department's Helicopter Landing Pad at Hunters Point Shipyard, San Francisco, Ca. (September 1997)

Development of Proposed Soil Remediation Levels for the Marine Corps Air-Ground Combat Center, 29 Palms, California (May 30, 1991)

Health Risk Assessment for the Chrome Plating Facility, Mare Island Naval Shipyard, Vallejo, California (October 24, 1988)

Background Levels and Health Risk Assessment of Trace Metals present at the Naval Petroleum Reserve No.1, 27R Waste Disposal Trench Area, Lost Hills, California (August 12, 1988)

RCRA Facility Investigation (RFI) Work Plan of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (August 14, 1989)

Hazardous Waste and Solid Waste Audit and Management Plan, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (July 3, 1989)

Water Quality Solid Waste Assessment Test (SWAT) Proposal RCRA Landfill, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (October 31, 1988)

Waste Disposal Facilities, Waste Haulers, Waste Recycling Facilities Report, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 22, 1988)

Sampling and Analysis Plan, Health and Safety Plan, Site Characterization of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 2, 1988)

Air Quality Solid Waste Assessment Test (SWAT) Proposal, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (August 25, 1988)

Liquefied Natural Gas (LNG)

Dr. Greenberg assisted the CEC in the preparation of the "background" report on the risks and hazards of siting LNG terminals in California ("LNG in California: History, Risks, and Siting" July 2003) and consulted for the City of Vallejo on a proposed LNG terminal and storage facility at the former Mare Island Naval Shipyard. He has also conducted an evaluation and prepared comments on the risks, hazards, and safety analysis of the DEIS/DEIR for the City of Long

Beach on a proposed LNG terminal at the Port of Long Beach (POLB) and conducted an analysis on vulnerability and critical infrastructure security for the CEC on this same proposed LNG terminal. He currently advises the CEC on the POLB LNG proposal on risks, hazards, human thresholds of thermal exposure, vulnerability, security, and represented the CEC at a U.S. Coast Guard briefing on the Waterway Suitability Assessment that included the sharing of SSI (Sensitive Security Information). He has presented technical information and analysis to the State of California LNG Interagency Working Group on thermal radiation public exposure criteria and safety/security at an east coast urban LNG terminal. (Both presentations are confidential owing to the nature of the material.) He has conducted numerous evaluations of the safety and hazards of natural gas pipelines for the CEC and has presented his findings and recommendations at public meetings and evidentiary hearings.

Infrastructure Security

Since 2002, Dr. Greenberg has been trained by and is working with the Israeli company SB Security, LTD, the most experienced and tested security planning and service company in the world. Since the events of 9/11, Dr. Greenberg has been the lead person for developing vulnerability assessments and power plant security programs for the California Energy Commission (CEC). In taking the lead for this state agency, Dr. Greenberg has interfaced with the California Terrorism Information Center (CATIC) and provided analysis, recommendations, and testimony at CEC evidentiary hearings regarding the security of power plants within the state. These analyses include the assessment of Critical Infrastructure Protection, threat assessments, criticality assessments, and the preparation of vulnerability assessments and off-site consequence analyses addressing the use, storage, and transportation of hazardous materials, recommendations for security to reduce the threat from foreign and domestic terrorist activities, perimeter security, site access by personnel and vendors, personnel background checks, management responsibilities for facility security, and employee training in security methods. Dr. Greenberg is the lead person in developing a model power plant security plan, vulnerability assessment matrix, and a security training manual for the CEC. The model security plan is used by power plants in California as guidance in developing and implementing security measures to reduce the vulnerability of California's energy infrastructure to terrorist attack. He has testified at several evidentiary hearings for the CEC on power plant security issues. He also leads an audit team conducting safety and security audits at power plants throughout California that are under the jurisdiction of the CEC. In addition to providing security expertise to the State of California, in August 2004, a team of experts led by Dr. Greenberg was awarded an 18-month contract by the State of Hawaii to update and improve the state's Energy Emergency Preparedness Plan and make recommendations for increased security of critical energy infrastructure on this isolated group of islands.

Air Pathway Analysis

Dr. Greenberg has prepared numerous Air Pathway Analyses and human health risk assessments, evaluating exposure at numerous locations in California, Hawai'i, Oregon, Minnesota, Michigan, and New York. He is experienced in working with Region IX EPA, the State of California DTSC, and the Hawai'i Department of Health Clean Air Branch in the application of both site-specific and non site-specific health risk assessment criteria.

Examples

Human Health Risk Assessment for the Open Burn/Open Detonation Operation at McCormick Selph, Inc., Hollister, Ca. (June 2003)

Air Quality and Human Health Risk Assessment for the Royal Oaks Industrial Complex, Monrovia, Ca. (January 2003)

Human Health Risk Assessment and Indoor Vapor Intrusion Assessment for the former Pt. St. George Fisheries Site, Santa Rosa, Ca. (October 2002)

Human Health Risk Assessment for the former Sargent Industries Site, Huntington Park, Ca. (July 2001)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)

The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Health Risk Assessment and Air Pathway Analysis for the Ballard Canyon Landfill, Santa Barbara County, Ca. (March 1999)

Human Health Risk Assessment, Teledyne Ryan Aeronautical, McCormick Selph Ordnance. Hollister, California. (December 1996)

Initial Phase Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (October 1996)

Human Health Risk Assessment for Current and Proposed Expanded Class II and Class III Operations at the Altamont Sanitary Landfill, Alameda County, Ca. (March, 1993)

Focused Ecological Risk Characterization, Hawaiian Electric Company, Keahole Generating Station Expansion, Hawai'i (June 1993)

Human Health Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawai'i Office of Space Industry (April 1993)

Ecological Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawai'i Office of Space Industry (March 1993)

Human Health Risk Assessment Due to Emissions from a Medical Waste Incinerator, prepared for Kauai Veterans Memorial Hospital, Kauai, Hawai'i (1994)

Cancer Risk Assessment for the H-Power Generating Station, Campbell Industrial Park, Oahu, Hawai'i (1988)

Hazardous Materials Assessments, Waste Management Assessments, Worker Safety and Fire Protection Assessments, and Public Health Impacts Assessments

Dr. Greenberg also has significant experience as a consultant and expert witness for the California Energy Commission providing analysis, recommendations, and testimony in the areas of hazardous materials management, process safety management, waste management, worker safety and fire protection, and public health impacts for proposed power plant/cogeneration facilities. These analyses include the evaluation and/or preparation of the following:

- Off-site consequence analyses of the handling, use, storage, and transportation of hazardous materials,
- Risk Management Plans (required by the Cal-ARP) and Business Plans (required by H&S Code section 25503.5),
- Safety Management Plans (required by 8 CCR section 5189),
- Natural gas pipeline safety,
- Solid and hazardous waste management plans,
- Phase I and II Environmental Site Assessments,
- Construction and Operations Worker Safety and Health Programs,
- Fire Prevention Programs,
- Human health risk assessment from stack emissions and from diesel engines, and
- Mitigation measures to address PM exposure, including diesel particulates

Examples

- Almond 2 Power Plant Project, City of Ceres, Ca. 2009 – present. Public health.
- Watson Cogeneration Steam and Electric Reliability Project, Carson, Ca. 2009 – present. Public health.
- Hanford Combined-Cycle Power Plant (amendment), Kings County, Ca. 2008 – present. Public health.
- Henrietta Combined-Cycle Power Plant (amendment), Kings County, Ca. 2008 – present. Public health.
- Lodi Energy Center, Lodi, Cal. 2008 – present. Hazardous materials management, worker safety/fire protection.
- Marsh Landing Generating Station, City of Antioch, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection.
- Palmdale Hybrid Power Plant, Palmdale, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection, public health.
- Stirling Energy Systems Solar 1 Project, San Bernardino County, Ca. 2008 – present. Public health.
- Stirling Energy Systems Solar 2 Project, Imperial County, Ca. 2008 – present. Public health.
- San Joaquin Solar 1&2, Fresno County, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection, public health.
- GWF Tracy Combined Cycle Power Plant, Tracy, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection, public health.
- CPV Vaca Station Power Plant, Vacaville, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection.

- Willow Pass Generating Station, Pittsburg, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection, waste management.
- Avenal Energy Power Plant, Avenal, Ca. 2008 – 2009. Worker safety/fire protection, public health.
- Orange Grove Energy, San Diego County, Ca. 2008-2009. Public health.
- Riverside Energy Resource Center Units 3&4, Riverside, Ca. 2008 – 2009. Hazardous materials management.
- Canyon Power Plant, Anaheim, Ca. 2007 – present. Hazardous materials management, worker safety/fire protection, public health.
- Carlsbad Energy Center, Carlsbad, Ca. 2007 – present. Hazardous materials management, worker safety/fire protection, public health.
- Ivanpah Solar Electric Generating System, San Bernardino County, Ca. 2007 – present. Public health.
- Kings River Conservation District Community Power Project, City of Parlier, Ca. 2007 – 2009. Hazardous materials management, worker safety/fire protection.
- Chula Vista Energy Upgrade Project, Chula Vista, Ca. 2007 – 2009. Hazardous materials management, worker safety/fire protection.
- Chevron Richmond Power Plant Replacement Project, Richmond, Ca. 2007 – 2008. Hazardous materials management, public health.
- Humboldt Bay Generating Station, Eureka, Ca. 2006 – 2008. Hazardous materials management, worker safety/fire protection, waste management.
- El Centro Power Plant – Unit 3 Repower Project, El Centro, Ca. 2006 – 2007. Public health.
- San Francisco Energy Reliability Project, San Francisco, Ca. 2004 – 2006. Hazardous materials management, worker safety/fire protection, waste management, public health
- Inland Empire Energy Center, Romoland, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Malburg Generating Station Project, City of Vernon, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Blythe II, Blythe, Ca. 2002-3. hazardous materials, worker safety/fire protection,
- Palomar Energy Center, Escondido, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Cosumnes Power Project, Rancho Seco, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Tesla Power Project, Tesla, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- San Joaquin Valley Energy Center, San Joaquin, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management
- Morro Bay Power Plant, Morro Bay, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Potrero Power Plant Unit 7, San Francisco, Ca., 2001-2: hazardous materials, worker safety/fire protection
- El Segundo Power Redevelopment Project, El Segundo, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Rio Linda Power Project, Rio Linda, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health

- Pastoria II Energy Facility Expansion, Grapevine, Ca., 2001: hazardous materials, worker safety/fire protection
- East Altamont Energy Center, Byron, Ca., 2001-2: hazardous materials, worker safety/fire protection
- Magnolia Power Project, Burbank, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Russell City Energy Center, Hayward, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Woodbridge Power Plant, Modesto, Ca., 2001: hazardous materials, worker safety/fire protection, waste management
- Colusa Power Plant Project, Colusa County, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Valero Refinery Cogeneration Project, Benicia, Ca., 2001: hazardous materials, worker safety/fire protection
- Ocotillo Energy Project, Palm Springs, Ca., 2001: hazardous materials, worker safety/fire protection
- Gilroy Energy Center Phase II Project, Gilroy, Ca., 2001-2: hazardous materials, worker safety/fire protection
- Los Esteros Critical Energy Facility, San Jose, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Roseville Energy Facility, Roseville, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Spartan Power, San Jose, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Inland Empire Energy Center, Romoland, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- South Star Cogeneration Project, Taft, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Tesla Power Plant, Eastern Alameda County, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Tracy Peaker Project, Tracy, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Henrietta Peaker Project, Kings County, Ca., 2001: hazardous materials, worker safety/fire protection, waste management, public health
- Central Valley Energy Center, San Joaquin, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Cosumnes Power Plant, Rancho Seco, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Los Banos Voltage Support Facility, Western Merced County, Ca., 2001-2: waste management, public health
- Palomar Energy Project, Escondido, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Metcalf Energy Center, San Jose, Ca., 2000-1: hazardous materials
- Blythe Power Plant, Blythe, Ca., 2000-1: hazardous materials
- San Francisco Energy Co. Cogeneration Project, San Francisco, Ca., 1994-5: hazardous materials

- Campbell Soup Cogeneration Project, Sacramento, Ca., 1994: hazardous materials
- Proctor and Gamble Cogeneration Project, Sacramento, Ca., 1993-4: hazardous materials
- San Diego Gas and Electric South Bay Project, Chula Vista, Ca., 1993: hazardous materials
- SEPCO Project, Rio Linda, Ca., 1993: hazardous materials
- Shell Martinez Manufacturing Complex Cogeneration Project, Martinez, Ca., 1993: hazardous materials and review and evaluation of EIR

Occupational Safety and Health/Health and Safety Plans/Indoor Air Quality

Dr. Greenberg has significant experience in occupational safety and health, having directed the development, adoption, and implementation of over 50 different Cal/OSHA regulations, including airborne contaminants (>450 substances), lead, asbestos, confined spaces, and worker-right-to-know (MSDSs). He has conducted numerous occupational health surveys and has extensive experience in the sampling and analysis of indoor air quality at residences, workplaces, and school classrooms. He is currently the team leader conducting safety and security audits at power plants throughout California for the California Energy Commission. Safety issues audited include compliance with regulations addressing several safety matters, including but not limited to, confined spaces, lockout/tagout, hazardous materials, and fire prevention/suppression equipment.

Examples

Review and Evaluation of Public and Worker Safety Issues at the proposed SES LNG Facility, Port of Long Beach. prepared for the City of Long Beach. (November 2005)

Confidential safety and security audit reports for 18 power plants in California. prepared for the California Energy Commission. (January 2005 through March 2006)

Report on the Accidental release and Worker Exposure to Anhydrous Ammonia at the BEP I Power Plant, Blythe, Ca. prepared for the California Energy Commission. (October 2004)

Investigation of a Worker Death in a Confined Space, La Paloma Power plant. prepared for the California Energy Commission. (July 2004)

Preliminary Report on Indoor Air Quality in Elementary School Portable Classrooms, Marin County, Ca. (December 1999)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

Air Pathway Analysis for the Ballard Canyon Landfill. Submitted to the County of Santa Barbara, (March 1999)

Review and Evaluation of the Health Risk Assessment for Outdoor and Indoor Exposures at the Former Golden Eagle Refinery Site, Carson, Ca. (May 1998)

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)

The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Phase 2 Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (February 1997)

Determination of Occupational Lead Exposure at a Tire Shop in Placerville, Ca. (April 1993)

Development of an Environmental Code of Regulations for Hazardous Waste Treatment Facilities on La Posta Indian Tribal lands, San Diego County, Ca. (August 1992)

Sampling and Analysis Plan, Health and Safety Plan, Site Characterization of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 2, 1988)

Mercury Contamination

Dr. Greenberg has prepared and/or reviewed several human health and ecological risk assessments regarding mercury contamination in soils, sediments, and indoor surfaces. Dr. Greenberg served on the State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee from 1994 until the end of the program in 1999.

Examples

Review and evaluation of a human health risk assessment of ingestion of sport fish caught from San Diego Bay and which contain tissue levels of mercury and PCBs (November 2004 – present)

Screening Human Health Risk Assessment, Calculation of Soil Clean-up Levels, and Aquatic Ecological Screening Evaluation, Galilee Harbor, Sausalito, Ca. (May 1998)

Health Risk Assessment for Residual Mercury at the Deer Creek Facility, 3475 Deer Creek Road, Palo Alto, California. (July 1997)

Human Health Risk Assessment Due to Emissions from a Medical Waste Incinerator, prepared for Kauai Veterans Memorial Hospital, Kauai, Hawai'i (1994)

DECLARATION OF SHAELYN STRATTAN

I, **Marsha L. (Shaelyn) Strattan**, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division as a **Planner II**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on **Land Use, Recreation, and Wilderness** for the **Ridgecrest Solar Power Project**, based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 3/23/10

Signed: Original signed by S. Strattan

At: Sacramento, California

Marsha L. (Shaelyn) Strattan
California Energy Commission Planner II
Siting, Transmission, and Environmental Protection Division

EXPERIENCE SUMMARY

Nine years experience in land use planning, recreation, environmental review and analysis, and project management with the California Energy Commission, California State Parks, and Calaveras County Planning Department. Twenty-five years of writing, editing, and research experience, focused on recreation, agriculture, and the environment, with the California Air Resources Board, California Department of Toxic Substances Control, California Department of Fish and Game, and as owner of *The Wordworker*, a writing, editing, and research company, specializing in environmental research, education, and public relations. Seven years experience as an Air Traffic Control Specialist with the Federal Aviation Administration and U.S. Air Force.

PROFESSIONAL EXPERIENCE

California Energy Commission

Planner II

2 yrs/3 mos¹

Environmental Technical Specialist - Identify, describe, and analyze complex environmental issues related to the construction and operation of electrical energy production facilities, transmission corridors, alternative energy technologies and energy conservation, and Commission programs and policies. Prepare components of Staff Analyses to comply with requirements of the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), with emphasis on the identification and mitigation of environmental impacts to land use, traffic and transportation, visual resources, and environmental justice. Prepare and present Commission reports and expert technical testimony.

Project Manager - Plan, organize, and direct the work of an interdisciplinary environmental and engineering staff team engaged in the evaluation of complex/controversial energy facility siting applications and major commission programs.

California Energy Commission (CEC): Analyst for Eastshore Energy Power Plant (06-AFC-06; Land Use and Traffic & Transportation/Aviation); Victorville II Hybrid Power Project (07-AFC-01; Land Use); Humboldt Bay Generating Station (06-AFC-07; Traffic & Transportation); Ridgecrest Solar Power Project (09-AFC-9; Land Use/Recreation/ Wilderness); Rice Solar Energy Project (09-AFC-10; Land Use/Recreation/Wilderness); and Russell City Energy Center Amendment (01-AFC-7C; Land Use and Traffic & Transportation/ Aviation). Project Manager for Beacon Solar Energy Project (08-AFC-02); San Gabriel Generating Station (07-AFC-02); and Kings River Conservation District Community Power Project (07-AFC-07)

Calaveras County Planning Department

2 yrs/9 mos²

Planner III (Senior Planner)

Planning and evaluation of complex land use projects; environment review (CEQA/NEPA); project and contract manager for consultants (EIR, natural and cultural resource studies, and peer reviews); preparation/review of resource ordinances; preparation/coordination of conservation and utility easements; CEQA coordinator; liaison with Calaveras Council of Governments and county counsel on land use issues.

¹ Nov 2006 – Nov 2008 and Dec 2009 – present.

² Feb 2005 – Nov 2006 and Nov 2008 – Nov 2009

California Department of Parks & Recreation
Environmental Coordinator (Associate Park & Recreation Specialist)

Jan 2001 - Jan 2005

Supervising Lead: Coordinate environmental review for DPR's Major Capital Outlay, Minor Capital Outlay, and Accessibility programs with Service Center and district staff. Consult with project managers, designers, and environmental specialists to refine project scope and identify potentially significant adverse environmental impacts for park projects in Northern and Central California. Prepare environmental documents (CEQA/NEPA) for DPR projects. Project and contract manager for consultants preparing environmental analysis. Prepare or work with consultants to prepare the environmental impact analysis for General Plans (GPs) and Resource Management Plans for State Park units. Prepare application(s) for project-specific state and federal environmental permits. Prepare grant proposal, application, and supporting documents for project-related federal funding (High Sierra Museum and Visitor Center at Donner Memorial State Park). Review environmental documents prepared by non-departmental entities to determine the potential impact on ongoing or proposed projects or programs. Prepare comments identifying potential impacts to the department's interests and/or effectiveness of proposed mitigation. Review and comment on pending legislation, as it relates to environmental issues, CEQA/NEPA, and Departmental policy/procedures.

Statewide Environmental Coordinator (January 2002 - June 2003): Develop and coordinate a standardized CEQA review process and establish criteria for evaluating project impacts and environmental compliance documents. Provide training for District and Service Center personnel involved in the preparation and processing of environmental documents. Develop training support materials. Conduct CEQA seminars at California Trails and Greenways Conference (September 2002 & 03) and Resource Ecologists' In-Service Training Seminar (2002). Act as Service Center liaison with the Environmental Stewardship Section of the Natural Resources Division regarding the effectiveness and improvement of the environmental review process.

California Air Resources Board (Research Division)
Research Writer

Nov 1998-Nov 2000

Research, write, and/or edit technical documents, presentations, and related materials, with special emphasis on scientific and environmental writing for a general readership. These documents include Requests for Proposals; responses to public inquiries; consumer guidelines and fact sheets; articles for magazines and technical journals; brochures; webpage information (both internal and external); legislative bill analyses; briefing documents; proposals; and Board presentations and agenda items. Evaluate suitability of documents for publication.

The Wordworker
Owner & Primary Researcher/Editor/Author

May 1987-Nov 1999

Work included narratives (including voice-overs), scripting, copy editing, transcription, and technical writing; proposals (grants, bids, and new business); legal briefs (environmental and family law); training and teacher's manuals; desktop publishing (brochures, newsletters, flyers, etc.); and adaptation of scientific information for general readership. Research, draft, review/edit, and comment on CEQA/NEPA environmental documents; coordinate preparation of materials among project scientists, lead and responsible agencies, and applicants. Promotional consultant and press liaison for several non-profit fundraisers, seminars, and symposiums.

Federal Aviation Administration
Air Traffic Control Specialist

1975-1981

Control air traffic at Salem Tower (Salem, OR) and the Oakland Air Traffic Control Center in Fremont, CA. Coordinate aviation-related search and rescue operations. Provide pilot weather briefings, flight

plan assistance, and in-flight information at Bellingham International Airport, Dannelly Field (Montgomery, AL) and Purdue University Airport (W. Lafayette, IN).

***Tennessee Valley Authority
Engineering Aide***

1974-75 (18 mos)

Set, monitor, and analyze dosimeters at Browns Ferry and Sequoia Nuclear Power Plants. Collect and analyze vegetation, silage, milk, water, and air samples from surrounding areas to establish background radiation levels and provide on-going radiation monitoring.

EDUCATION

- Colleges & Universities
 - American River College (Sacramento, CA)
 - Calhoun Community College (Huntsville, AL)
 - University of Alabama (Tuscaloosa, AL)
 - Whatcom Community College (Bellingham, WA)
 - California State University – Sacramento
- Certificate: Land Use and Environmental Planning (University of California – Davis)
- Certificate: Technical Writing (American River College)
- Certificate: Meteorology/Weather Observer (National Weather Service; 1975);
Licensed 1975-1982

MILITARY SERVICE

- U.S. Air Force - Aircraft Control & Warning Operator (honorable discharge – August 1969)
- California Air National Guard – Air Traffic Controller (honorable discharge 1984)

DECLARATION OF Erin Bright

I, **Erin Bright**, declare as follows:

1. I am presently employed by the California Energy Commission in the **Engineering Office** of the Siting Transmission and Environmental Protection Division as a **Mechanical Engineer**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on **Noise and Vibration** for the **Ridgecrest Solar Power Project** based on my independent analysis of the Application, supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: February 18, 2010

Signed: Original signed by E. Bright

At: Sacramento, California

Erin Bright
Mechanical Engineer

Experience Summary

One year of experience in the electric power generation field, including analysis of noise pollution, construction/licensing of electric generating power plants, and engineering and policy analysis of thermal power plant regulatory issues. One year of experience in the alternative energy field, including analysis of alternative fuel production and use.

Education

- University of California, Davis--Bachelor of Science, Mechanical Engineering and Materials Science
- University of California, Davis Extension Program--Renewable Energy Systems

Professional Experience

2007 to Present-- Mechanical Engineer, Energy Facilities Siting Division - California Energy Commission

Performed analysis of generating capacity, reliability, efficiency, noise, and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases.

2006 to 2007--Energy Analyst, Fuels & Transportation Division - California Energy Commission

Performed analysis of use potential and environmental effects of emerging non-petroleum fuels, including compressed natural gas, biomass, hydrogen and electricity, in heavy and light duty transportation vehicles. Contributor to Energy Commission's alternative fuels plan.

DECLARATION OF SUE WALKER

I, **SUE WALKER** declare as follows:

1. I am presently employed by the California Energy Commission in the **SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION** of the Energy Facilities Siting Division as a **SENIOR TECHNICAL SPECIALIST**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff testimony on **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE**, for the **SOLAR MILLENNIUM RIDGECREST SOLAR POWER PROJECT** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: March 19, 2010 Signed: Original signed by Sue Walker

At: Goleta, California



SUSAN S. WALKER

Senior Associate, Environmental Planning

ACADEMIC BACKGROUND

M.A., Applied Geography, City University of New York, 1988

B.A., Physical Geography, University of Colorado at Boulder, 1983

PROFESSIONAL EXPERIENCE

Ms. Walker joined Aspen Environmental Group in 2000, and has over 20 years of experience in environmental consulting. Ms. Walker primarily functions as a Project Manager for both large- and small-scale multidisciplinary environmental review documents under the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA). Ms. Walker additionally functions as a Senior Analyst and Issue Area Coordinator for land use and public policy analyses and related social science analyses. Ms. Walker also has expertise in regulatory permit acquisition, the development of permit compliance strategies, permit compliance implementation and tracking, agency coordination and relations, and, assistance with GIS planning and implementation. Ms. Walker's project-specific efforts are provided below.

Aspen Environmental Group

2000 to present

- **California Valley Solar Ranch Project, County of San Luis Obispo Department of Planning and Building, Senior Analyst (2009 - Present).** Ms. Walker is currently serving as a senior analyst for an Environmental Impact Report (EIR) addressing a proposed 250-megawatt photovoltaic solar power plant in the Carrizo Plain of eastern San Luis Obispo County. The EIR also includes analysis of a proposed surface aggregate mine on property adjacent to the proposed solar project. Ms. Walker is preparing the document's land use and recreation analysis, including a comprehensive policy consistency analysis of San Luis Obispo County's General Plan and related zoning ordinances. Ms. Walker is additionally preparing a "stand alone" analysis of historic agricultural uses and patterns in the project area based upon examination and assessment of a suite of aerial photographs taken over an approximate 40 year time frame.
- **Topaz Solar Farm Project, County of San Luis Obispo Department of Planning and Building, Senior Analyst (2009 - Present).** Ms. Walker is functioning as a senior analyst for an EIR that is being prepared for a proposed 550-megawatt photovoltaic solar power plant in the Carrizo Plain of eastern San Luis Obispo County. The project includes two "options" ranging in size between 6,500 and 8,000 acres. Ms. Walker is preparing the EIR's land use and recreation analysis and is also completing an analysis of past agricultural uses and practices within the project area over an approximate 40 year period. Ms. Walker is also assisting with the facilitation of public workshops and meetings.
- **Ridgecrest Solar Power Project, California Energy Commission (CEC), Senior Analyst (2009 - Present).** Ms. Walker is currently preparing the socioeconomic and environmental justice analysis for a Staff Assessment/Environmental Impact Statement (SA/EIS) addressing a proposed 250-megawatt solar power plant near the City of Ridgecrest in northeast Kern County. Ms. Walker is responsible for the research and preparation of the project's "baseline" conditions for social and economic attributes, including public services, recreation and minority and below-poverty-level

populations, as well as an impact analysis addressing the proposed project, its alternatives and cumulative projects.

- **Upper San Antonio Creek Watershed Giant Reed Removal Project, Ventura County Watershed Protection District (VCWPD), Project Manager (2008 – 2009).** Ms. Walker served as the Project Manager for an Initial Study and Mitigated Negative Declaration (IS/MND) for the proposed removal of giant reed (*Arundo donax*) and the opportunistic removal of castor bean (*Ricinus communis*) in the tributaries that make up the upper San Antonio Creek watershed, which is located in the Ojai Valley of Ventura County, California. She was responsible for: completion of the Administrative Draft, Public Draft and Final IS/MNDs; preparation of several sections of the IS and MND, including their respective Project Descriptions, the IS General Plan policy consistency analysis and the MND's Mitigation Monitoring and Reporting Plan; completion of all public and agency CEQA noticing and IS/MND distribution; and, support at public hearings. Ms. Walker was additionally responsible for oversight of the project's regulatory permit application package for review and approval by the California Department of Fish and Game.
- **Baldwin Hills Community Standards District, City of Culver City, Senior Analyst (2008 – 2009).** Ms. Walker served as a senior analyst for technical review of an EIR addressing a proposed Community Standards District for onshore oil well drilling and production in the Baldwin Hills area of Los Angeles County, California. Ms. Walker was responsible for review and comment on the Draft EIR's Project Description, land use, recreation and environmental justice sections, and preparing responses to the Final EIR's responses to comments on the Draft EIR. She additionally prepared a stand-alone "white paper" on the onshore oil well drilling and operational regulations, permits, bonds and taxes required by the State and local jurisdictions (incorporated cities and counties) within southern California. She is currently providing senior review during the City of Culver City's development of a separate Community Standards District and permitting process for oil well drilling and operation within its jurisdictional boundaries.
- **Port of Los Angeles Channel Deepening Project, U.S. Army Corps of Engineers (Corps), Issue Area Coordinator for Social Sciences and Senior Analyst (2005 – 2009).** Ms. Walker served as the Issue Area Coordinator for the social sciences, and as a senior technical analyst for a Supplemental Environmental Impact Statement/Environmental Impact Report (Supplemental EIS/EIR) addressing proposed channel deepening within the Port of Los Angeles. Ms. Walker completed senior technical reviews of all resource/issue-specific analyses related to the social sciences, and also functioned as either the principal analyst or as a co-analyst for the Supplemental EIS/EIR's land use, visual resources, recreation, socioeconomic and environmental justice analyses.
- **Sylmar to Pacific Ocean DC Electrode Replacement Project, City of Los Angeles Department of Water and Power (LADWP), Project Manager (2006 – 2008).** Ms. Walker served as the Project Manager for preparation of an Initial Study for replacement of the onshore, underground segment of a direct current (DC) electrode located in the vicinity of West Los Angeles, Santa Monica, and Pacific Palisades, California. Ms. Walker was responsible for overall coordination and management of Aspen Environmental Group's (Aspen's) project team and its subcontractors, senior technical review of all resource/issue-specific analyses, oversight of document reproduction and distribution and development of a CEQA-related public property owner and agency distribution list, and, preparation of the Initial Study's Project Description, mandatory findings of significance, and land use and recreation analyses.
- **Lake Canyon Dam and Detention Basin, VCWPD, Project Manager (2006 – 2008).** Ms. Walker served as the Project Manager for a proposed flood control detention basin and dam located in Ventura County, California; the purpose of the project was to protect areas within the City of Ventura from flood waters associated with a 100-year storm event. Ms. Walker was responsible for the management of the project's Initial Study and all aspects of its public and agency noticing and distribution, as well as coordination and facilitation of the project's public and agency meetings. She was additionally responsible for all aspects of Aspen's initial efforts regarding preparation of the

project's Draft EIR; during preparation of the Draft EIR the project was suspended for the purpose of evaluating alternative means of flood control within the project area.

- **Ormond Beach Wetlands Restoration Feasibility Study, California State Coastal Conservancy, Project Manager (2006 – 2009).** Initiated by Aspen in 2003, Ms. Walker assumed management of the Ormond Beach Wetlands Restoration Feasibility Study in 2006. The project involves proposed wetlands restoration of more than 750 acres of land within the Oxnard Plain of Ventura County, California. The project includes: identifying restoration goals with the assistance of regional experts and local stakeholders; assessing various opportunities and constraints in the project area (biological, engineering, cultural, infrastructure, regulatory, land use, land availability, funding, soils and surface water contamination and remediation, water quality, geotechnical, socioeconomic, and recreation); developing a suite of potential restoration alternatives that range in breadth from development of a full tidal lagoon to enhancing existing non-tidal wetland habitats; evaluating and ranking these alternatives at a resource-specific level; and, providing short-term and long-term recommendations for project implementation.
- **Tehachapi Renewable Transmission Project, California Public Utilities Commission (CPUC), Issue Area Coordinator for Social Sciences and Senior Analyst (2007 – Present).** Ms. Walker is currently acting as the land use analyst and Issue Area Coordinator for the social sciences for the Tehachapi Renewable Transmission Project's EIR/EIS, and its associated resource/issue-specific Specialist Reports. The project involves a suite of new, replacement and modified transmission lines extending from a planned substation located southeast of the City of Tehachapi, Kern County, to a substation located in the City of Ontario, San Bernardino County; the project also involves one new and several expanded substations. Ms. Walker is responsible for the management, coordination and senior technical oversight of seven technical teams, including cultural resources, visual resources, socioeconomic, agricultural resources, recreation and wilderness, environmental justice, and public utilities. She is additionally responsible for preparation of the EIR/EIS's land use analysis. Her efforts have also included review of the Proponent's Environmental Assessment (PEA) for technical adequacy, the preparation of data adequacy comments and data requests, and assistance with development of the technical approach for the analysis of cumulative impacts.
- **Redmont Pump Station Replacement Project, LADWP, Project Manager and Senior Analyst (2007 – 2008).** Ms. Walker served as the Project Manager for an IS/MND addressing a proposed water supply pump station replacement project in the community of Sunland, which is located in the City of Los Angeles, California. Ms. Walker was responsible for preparation of the IS/MND's Project Description and Mitigation Monitoring Plan, completion of the IS/MND's land use and planning, recreation, aesthetics, and mandatory findings of significance, management of Aspen's project team, including its subcontractors, senior technical review of all resource/issue-specific analyses addressed in the IS/MND, and oversight of document reproduction. Ms. Walker was additionally responsible for completion of the project's CEQA notices for public and agency review and comment.
- **Tranquillon Ridge Oil and Gas Development Project, Santa Barbara County, Senior Analyst (2006 – 2008).** Ms. Walker served as a senior technical analyst for an EIR addressing proposed oil and gas development of the Tranquillon Ridge oil and gas field, located in State waters offshore northern Santa Barbara County, California. Ms. Walker completed the EIR's analyses for visual resources/aesthetics, land use and public policy, and recreation. Ms. Walker additionally assisted with development of the EIR's off- and on-shore cumulative project listings and descriptions, as well as completion of multiple resource/issue-specific technical analyses for the EIR's cumulative impacts assessment.
- **Owens River Gorge Restoration Project, LADWP, Project Manager and Senior Analyst (2005 – 2006).** Ms. Walker served as both the Project Manager and a senior technical analyst for a preliminary environmental review of proposed modifications to the water flows released into an approximate 10-mile reach of the Owens River Gorge, located in Mono and Inyo Counties, California. The analysis was completed for the Los Angeles Department of Water and Power for

habitat restoration and maintenance. Ms. Walker was responsible for all aspects of the project's management, coordination and senior technical review for an Initial Study level of analysis, and prepared the document's Project Description, as well as numerous resource/issue-specific technical sections, including land use and planning, recreation, and mandatory findings of significance.

- **Preliminary Environmental Profile of California's Imported Electricity, CEC, Senior Analyst (2005).** Ms. Walker served as a contributing author of a technical report addressing the primary sources of California's imported electricity, and the key biological and water-related impacts associated with that electricity's generation. The report was prepared for the CEC in support of its "Environmental Performance in 2005 Integrated Energy Policy Report." Ms. Walker's efforts were focused on issues associated with power generated from natural gas and hydroelectricity. In addition, Ms. Walker provided overall assistance to the report's Project Manager, including overall staff coordination and guidance, as well as senior technical reviews.
- **Antelope-Pardee 500-kV Transmission Project, CPUC, Senior Analyst (2005 – 2007).** Ms. Walker served as a technical analyst for an Alternatives Siting Report for the proposed Antelope-Pardee 500-kV Transmission Project (Segments 2 and 3). Her efforts included the identification of alternative above- and below-ground Right-Of-Way alignments, coordination with transmission engineers to evaluate the technical feasibility of the alternatives, and preliminary assessments of the potential impacts and key advantages and disadvantages of the alternatives. Ms. Walker additionally prepared several technical sections of the project's environmental review document, including its assessment of both growth inducing impacts and irreversible and irretrievable commitment of resources. She also prepared numerous responses to comments on the Draft EIR/EIS for the purposes of its finalization, and completed several of the resource/issue-specific technical analyses included in the Final EIR/EIS's "Findings of Fact."
- **Environmental Information Document and Coastal Consistency Determinations for Federal Oil and Gas Leases Offshore Santa Barbara, Ventura and San Luis Obispo Counties, U.S. Department of the Interior, Minerals Management Service, Project Manager (2004 – 2005).** Ms. Walker served as the Project Manager for preparation of a multidisciplinary Environmental Information Document (EID) and ten federal Coastal Consistency Determinations that evaluated the potential effects of future development of the undeveloped federal oil and gas leases offshore Santa Barbara, Ventura and San Luis Obispo Counties, California. The documents addressed both lease-specific and cumulative impacts for the period 2006 through 2030. In addition to overall project management and coordination, Ms. Walker was responsible for senior technical review and the preparation of text regarding near- and long-term activities that may occur on the Pacific Outer Continental Shelf, and was a principal author of the California Coastal Act policy consistency analyses prepared for each of the project's Lease/Unit-specific Coastal Consistency Determinations.
- **Simulation of Natural Flows in Middle Piru Creek California Department of Water Resources (DWR), Project Manager (2004 – 2005).** Ms. Walker served as the Project Manager for an EIR addressing a proposed dam flow release modification schedule into middle Piru Creek, located in Ventura and Los Angeles Counties, California. The purpose of the project was to mimic natural surface water flows. Ms. Walker was responsible for overall management and coordination of the project team, senior technical review of all resource-issue specific analyses, and preparation of several sections of the EIR, such as the description of the proposed project and its alternatives and the analyses for the environmentally preferred alternative, growth-inducing impacts, and cumulative impacts. Ms. Walker was also responsible for the writing and publication/distribution of all public and agency notices, and coordinated the content of, and led the project's public workshops and meetings.
- **Ventura River Arundo Removal Demonstration Project, VCWPD, Project Manager and Senior Analyst (2003).** Ms. Walker served as the Project Manager for the preparation of an EIR for the proposed removal of giant reed (*Arundo donax*), a highly invasive non-native plant species, using four different removal and revegetation techniques within the Ventura River, Ventura County, California. Ms. Walker additionally served as the overall Project Manager for the effort's regulatory permit acquisition

program. Ms. Walker prepared multiple chapters of the EIR, including its Project Description, completed numerous technical analyses of the document, such as public health, visual resources, land use and planning, recreation, and General Plan environmental policy consistency, provided senior technical review for all other sections of the EIR, prepared for and participated in the project's public hearings, and assisted with the project's public noticing requirements under CEQA.

- **Morro Bay Power Plant Project, CEC, Power Plant Coordinator and Senior Analyst (2001 – 2002).** Ms. Walker served as the Power Plant Coordinator and land use analyst for preparation of the Preliminary and Final Staff Assessments (PSA and FSA, respectively) for the Morro Bay Power Plant Project. Ms. Walker managed Aspen's staff and subcontractors' work efforts and schedules, coordinated with the CEC Project Manager regarding overall project logistics and schedule, and, completed the land use analysis for the PSA and FSA, including in-depth coordination with California Coastal Commission staff and participation in public workshops and evidentiary hearings.
- **Mountain View Power Plant Project, CEC, Senior Analyst (2000).** Ms. Walker assisted with preparation of the socioeconomics analysis during preparation of the PSA and FSA for the proposed Mountain View Power Plant Project. Efforts included data searches and reviews, agency contacts, and preparation of the analysis and text for the PSA and FSA.
- **Inland Empire Power Plant Project, CEC, Power Plant Coordinator and Senior Analyst (2001 – 2003).** Ms. Walker acted as the Power Plant Coordinator and socioeconomics and alternatives analyst for the CEC's environmental review of the Inland Empire Power Plant Project. Efforts included overall staff coordination, communications and scheduling during preparation of the project's data adequacy analyses, PSA, and FSA, as well as the coordination of, preparation for, and participation in the project's various public workshops and hearings.
- **Coastal Power Plant Evaluation, CEC, Senior Analyst (2002).** Ms. Walker functioned as a senior analyst during preparation of an evaluation focused on the key environmental and regulatory issues associated with the licensing and operation of coastally located power plants within California. Ms. Walker conducted agency interviews, researched power plant-specific licensing cases and other project-specific analyses and reports, and prepared written summaries of the findings of these efforts for inclusion in a draft and final report for review by the CEC.
- **Level 3 Communications Infrastructure Project, CPUC, Deputy Project Manager and Senior Analyst (2000).** Ms. Walker served as the Deputy Project Manager for the preparation of 21 Initial Studies and a master Subsequent MND for the Level (3) Communications Infrastructure Project. The project consisted of the installation of nearly 2,000 miles of fiber optic telecommunications cable throughout California, as well as the cable's related above-ground support facilities. Ms. Walker managed in-house technical and support staff during preparation of the Draft and Final Initial Studies and Subsequent MND, coordinated the completion and publication/distribution of all necessary public and agency noticing, and, oversaw final document editing, compilation and production. Additionally Ms. Walker prepared the 21 Project Descriptions for each Initial Study, prepared the master overview section of the Subsequent MND, and completed each Initial Study's Population and Housing analysis.
- **Visalia Landfill Master Development Plan, Tulare County Resource Management Agency, Senior Analyst (2000).** Ms. Walker provided management assistance during preparation of Draft and Final EIRs for a proposed expansion of the Visalia Landfill, located in Tulare County, California. Ms. Walker completed the Draft and Final "Project Description" and "Introduction" sections of the EIR, conducted the land use and planning analysis of the EIR, and assisted with completion of the document's "Impact Overview" section. In addition, Ms. Walker assisted Aspen's Project Manager with overall project coordination and management of technical staff.
- **Bull Creek Channel Ecosystem Restoration Project, Corps, Project Manager (2000 – 2003).** Ms. Walker functioned as the Project Manager for preparation of an Environmental Assessment (EA) and Ecosystem Restoration Report (ERR) for the Bull Creek Channel Ecosystem Restoration Project. The project was sponsored by the Corps with cooperation by the City of Los Angeles. The project

involved restoration of a degraded reach of Bull Creek, located within the Sepulveda Dam and Flood Control Basin, as well as development of a new park and wetlands habitat area. Ms. Walker provided overall management of, and direction to the project's technical team, completed senior technical reviews of a draft and final documents, and also prepared several technical sections of the ERR and EA, including recreation, lands use, socioeconomics and visual resources.

- **San Jose/Old San Jose Creek Restoration Project, Corps, Senior Analyst (2000 – 2001).** Ms. Walker provided technical analysis for preparation of an EA and ERR for proposed restoration of the final reaches of San Jose and Old San Jose Creeks, located in Santa Barbara County, California. Her efforts included completion of “baseline” and impact analyses for several resource-specific issues, including land use and planning, recreation, aesthetics, and cumulative impacts, as well a preparation of several sections of the two documents’ overall content, such as their respective Project Descriptions and Project Purpose and Need.
- **Imperial Beach Shore Protection Project, Corps, Project Manager (2000 – 2002).** Ms. Walker served as the Project Manager for the Imperial Beach Shore Protection Project, a beach restoration effort sponsored by the Corps with participation by the City of Imperial Beach. The effort included preparation of a Draft and Final EIS/EIR for the project. Ms. Walker’s efforts included: coordination with Corps staff and managers regarding overall project logistics and schedule; management of the project’s in-house technical team and the project’s various subcontractors; preparation of many of the EIS/EIR’s non issue/resource-specific technical sections, such as the document’s Project Description; oversight of all document editing, compilation and production; and, participation in local and California Coastal Commission public hearings.
- **Prado Basin and Vicinity Project, Corps, Senior Analyst (2001).** Ms. Walker functioned as an analyst during finalization of the Prado Basin and Vicinity Project EIS/EIR. The project consisted of a proposal to raise the Prado Dam, located in San Bernardino County, California, and install a series of flood control structures within Prado Basin to provide greater flood control of the downstream area of the Santa Ana River. Ms. Walker prepared numerous responses to comments submitted on the Draft EIS/EIR, and also assisted with over project management and coordination.
- **Bellevue Primary Center Interim Facility, Los Angeles Unified School District (LAUSD), Analyst (2000).** Ms. Walker served as the Project Manager for a revised IS/MND for the LAUSD’s Bellevue Primary Center Interim Facility. The project consisted of the temporary relocation of a primary center located in the City of Los Angeles. Ms. Walker coordinated with LAUSD staff during preparation of the IS/MND, managed Aspen Environmental Group’s staff, oversaw final document editing, compilation and production, and, prepared the revised Project Description.
- **Hamilton High School Master Addition, LAUSD, Project Manager (2001 – 2002).** Ms. Walker acted as the Project Manager for an IS/MND for a proposed expansion of the Hamilton High School, located in the City of Los Angeles. Ms. Walker was responsible for: overall coordination and communications with LAUSD staff and its consultants; management and coordination of Aspen’s staff and its subcontractors; preparation of the documents’ general sections, such as the Project Description; and, senior technical review of all sections and analyses contained within the draft and final documents. Ms. Walker also prepared materials for, and participated during, the project’s public hearings and community outreach meetings.
- **Aldama Elementary School Master Addition, LAUSD, Project Manager (2001 – 2002).** Ms. Walker served as the Project Manager for an IS/MND addressing a proposed addition to the Aldama Elementary School, located in the City of Los Angeles. Ms. Walker was responsible for: overall coordination and scheduling of the project’s environmental review; senior technical review of all technical analyses prepared for the documents; preparation of several of the documents’ sections such as their Project Descriptions and the MND’s Mitigation Monitoring Plan; and, participation during the project’s public hearings.

- **Wonderland Avenue Elementary School Master Addition, LAUSD, Project Manager (2001 – 2003).** Ms. Walker served as the Project Manager for an IS/MND addressing a proposed addition to the Wonderland Avenue Elementary School, located in the City of Los Angeles. Ms. Walker was responsible for overall coordination and scheduling of the project's environmental review, review of all environmental review documents produced for the project, completion of several of the Initial Study's technical analyses, preparation of all of the responses to comments received on the Draft IS/MND, and, completion and distribution of the project's public and agency notices.
- **Reseda High School Master Portable Addition, LAUSD, Project Manager (2002 – 2003).** Ms. Walker served as the Project Manager for an IS/MND addressing proposed portable classroom additions to Reseda High School, located in the City of Los Angeles. Ms. Walker was responsible for overall management of Aspen's internal staff and subcontractors, senior technical review of all draft and final technical analyses, and preparation of several sections of the two documents, including the Initial Study's and MND's respective Project Descriptions, the MND's Mitigation Monitoring Plan, and the Initial Study's recreation, aesthetics, agricultural resources, hazards and hazardous materials, land use and planning, and mandatory findings of significance analyses.
- **Hughes Middle School Re-Opening, LAUSD, Project Manager (2003 – 2004).** Ms. Walker served as the Project Manager for the preparation of an Initial Study for a proposed re-opening of a middle school as a "span" school (6th through 12th grade students) in Woodland Hills, California. The analysis involved two separate school campuses, including a relocation of an existing Adult School. Ms. Walker was responsible for: overall management and coordination of the project team; preparation of numerous technical sections of the Initial Study; senior technical review of all other technical analyses; and, preparation for, and facilitation of the project's public scoping meeting. Ms. Walker was also responsible for the preparation, publication and distribution of all of the project's public and agency noticing.
- **LAUSD New Construction Program EIR, LAUSD, Senior Analyst (2003 – 2004).** Ms. Walker served as the senior analyst for an extensive public outreach and demographic analysis of the LAUSD's District-wide Program EIR for new school construction over a 15- to 20-year period. Ms. Walker was responsible for an in-depth assessment of numerous demographic and economic attributes of the District's population, both regionally and locally, and additionally assisted with sections of the document's "Program Description."
- **Morro Bay Sampling and Chemical Analysis Project, Corps, Project Manager (2001).** Ms. Walker acted as the Project Manager for a water sampling and chemical analyses project within Morro Bay. The purpose of the project was to sample selected locations of the Bay for the necessary approvals needed for proposed dredging activities. Principal agency approvals include the U.S. Environmental Protection Agency and California Coastal Commission. Ms. Walker's involvement included the coordination and scheduling of activities between the Corps and Aspen's subcontractors, and senior technical review of all documents submitted to the Corps.
- **Kern County Oil and Gas Development Permitting Evaluation, California Division of Oil, Gas and Geothermal Resources (DOGGR), Senior Analyst (2001 – 2003).** Ms. Walker served as a senior analyst for an evaluation of the local and State permitting processes for new oil and gas development projects within Kern County, California. Ms. Walker provided technical analyses of various regulatory, policy, and resource-specific issues, and also assisted with overall facilitation of the project during agency, industry, and special interest group meetings and workshops.
- **DOGGR Regulatory Compliance Initial Study (2003).** Ms. Walker served as a senior analyst for an Initial Study evaluating the California Division of Oil, Gas and Geothermal Resources' (DOGGR) proposed program for compliance with CEQA for oil and gas drilling in Kern County, California. Ms. Walker revised DOGGR's regulations for CEQA compliance for review by DOGGR counsel and the Deputy Attorney General, and prepared the agricultural resources and land use and planning analyses

of the project's Initial Study. Ms. Walker also assisted with overall project management, and provided senior technical review for several of the Initial Study's resource/issue-specific analyses.

- **Combined Array for Research in Millimeter-wave Astronomy Project Special Use Permit Application, California Institute of Technology, Senior Analyst (2000 – 2001).** Ms. Walker prepared several sections of a Special Use Permit (SUP) application package for submittal to the U.S. Forest Service for a proposed astronomy facility in the Inyo National Forest, California. Ms. Walker's efforts included an analysis of the federal, State and local regulatory permits and approvals required for the proposed facility, an evaluation of the facility's consistency with the U.S. Forest Service's SUP Screening Criteria, and technical editing and review of the project's final SUP application package.

PREVIOUS EXPERIENCE – 1989 THROUGH 1999

Prior to joining Aspen Environmental Group Ms. Walker served as a Project Manager at Dames & Moore (1989 – 1997), and as a contract planner with the Energy Division of the Santa Barbara County (California) Planning and Development Department (1997 – 1999). A selection of the projects she worked on during this period is provided below.

Environmental Impact Reports, Statements, and Analyses

- **Point Pedernales Project Modification.** Ms. Walker was responsible for completion of an Initial Study and EIR Addendum, and coordination of a Quantitative Risk Analysis for a proposed hydrogen sulfide concentration increase in the 23-mile off- to onshore natural gas pipeline of the Point Pedernales Project located in northern Santa Barbara County.
- **Santa Barbara County Groundwater Element.** Ms. Walker served as the project manager for a Public Draft revision and Final Programmatic EIR addressing the proposed adoption and implementation of a Groundwater Element into the Santa Barbara County Comprehensive General Plan.
- **Vista Del Mar School Relocation and Water Supply Pipeline.** Ms. Walker served as the Project Manager for preparation of a series of Supplemental and Addenda EIRs for construction of a proposed elementary school and water supply pipeline located in central Santa Barbara County.
- **Arroyo Las Posas Channel Improvements Project.** Ms. Walker served as the Project Manager for preparation of a Draft and Final EIR addressing a phased series of stream channel improvements to the Arroyo Las Posas, Ventura County. She additionally served as a technical analyst for land use and visual resources and participated in the project's public hearings.
- **Los Angeles Department of Water and Power Land Exchange.** Ms. Walker served as the Project Manager for Finalization of an EA and Senate Briefing Report for a proposed exchange of properties in Clarke County, Nevada, and Los Angeles County, California, by the Los Angeles Department of Water and Power and Bureau of Land Management.
- **Port of Oakland Feasibility Study.** Ms. Walker prepared an environmental feasibility analysis for proposed rail access to the Port of Oakland by the Atchison, Topeka & Santa Fe Railroad Company. The analysis included assessments of traffic and transportation, air quality, land use, and risk.
- **Mobil M-70 Pipeline Replacement.** Ms. Walker assisted with the overall coordination and preparation of an EIS/EIR addressing the replacement of a 92-mile crude oil pipeline located between Lebec and Torrance, California.
- **California Offshore Oil and Gas Resources Study.** Ms. Walker served as the Assistant Project Manager for the preparation of an extensive inter-disciplinary study evaluating the potential environmental, engineering, and socio-economic constraints associated with various levels of offshore oil and gas development in Ventura, Santa Barbara, and San Luis Obispo Counties.

- **Las Vegas Valley Flood Control Master Plan.** Ms. Walker assisted with the preparation of a Programmatic EIS for a long-range Master Plan of the Las Vegas Valley Flood Control District's phased Flood Control Improvements Project. Her efforts included overall project coordination and analysis of land use and facilities infrastructure.
- **Molycorp Wastewater Pipeline Replacement Project.** Ms. Walker prepared a detailed Project Description for regulatory permitting and inclusion in a joint EA/MND for replacement of a wastewater pipeline system operated for a rare earths mine located in the Mojave Desert.
- **Elsmere Solid Waste Facility.** Ms. Walker prepared of an extensive, multidisciplinary "standalone" Executive Summary for public review detailing the findings of an EIS/EIR for development of a regional landfill for Los Angeles County.
- **Atchison-Topeka Remediation Project.** Ms. Walker prepared an Initial Study and MND for a proposed remediation project in support of truck/train intermodal operations within the City of Vernon, California.
- **Bureau of Land Management Land Exchange.** Ms. Walker prepared socioeconomic and prime farmlands analyses for an EA addressing a series of proposed land exchanges within southern and central Nevada. Analysis included completion of a Farmland Protection Policy Act assessment and U.S. Natural Resource Conservation Service 1006 "Farmland Conversion Impact Rating Forms."

Environmental Regulatory Permitting and Compliance Planning

- **Mead-Adelanto Transmission Project.** Ms. Walker served as Project Manager for the multidisciplinary federal, State, and local regulatory permitting and construction-phase permit compliance planning and implementation of a 210-mile 500 kV transmission line extending from Boulder City, Nevada, to Adelanto, California.
- **Vista Del Mar Water Supply Pipeline.** Ms. Walker served as the Project Manager for the multidisciplinary regulatory permit acquisition and construction-phase compliance planning and implementation of an elementary school and water supply pipeline located in Santa Barbara County.
- **Point Pedernales Project Condition Effectiveness Review.** Ms. Walker completed a comprehensive Preliminary Screening Analysis assessing the effectiveness of the 192 conditions associated with the Santa Barbara County Final Development Plan for the Pt. Pedernales Project, an on- and offshore oil and gas development project.
- **Point Pedernales Project Permit Modifications.** Ms. Walker completed the analysis and regulatory processing of Final Development Plan Substantial Conformity Determinations and a Final Development Plan Director's Amendment for proposed modifications to the Pt. Pedernales Project's oil and gas processing facility located in northern Santa Barbara County, California.
- **Point Pedernales Project Regulatory Compliance.** Ms. Walker was responsible for the compliance tracking and enforcement of the 192 Final Development Plan conditions associated with the Pt. Pedernales Project, an on- and offshore oil and gas development project located in northern Santa Barbara County.
- **Torch Lompoc Gas Processing Facility.** Ms. Walker was responsible for the oversight and coordination of the final regulatory technical reviews and approvals required for commissioning and operation of a natural gas processing plant located in northern Santa Barbara County.
- **Los Medanos Energy Facility.** Ms. Walker served as the Assistant Project Manager during preparation of multiple amendments to an approved CEC Application For Certification for a series of proposed modifications to a power plant located in Contra Costa County.
- **Pastoria Energy Facility.** Ms. Walker served as a Principal Investigator and technical editor during preparation of a CEC Application For Certification for a proposed power plant located in southern

Kern County. Resource-specific investigations included assistance with completion of the application's socioeconomic, cumulative impacts, water supply, and "Applicable Laws, Ordinances, Regulations and Standards" analyses.

- **Kern River Natural Gas Pipeline.** Ms. Walker served as a Principal Investigator during the pre-construction preparation of compliance implementation plans, as well as construction-phase development and implementation of multiple databases tracking the environmental monitoring and regulatory permit compliance of a 904-mile natural gas pipeline traversing the states of Wyoming, Utah, Nevada, and California.
- **Hercules Remediation Project.** Ms. Walker assessed the federal, State, and local regulatory permit acquisition requirements for the remedial clean-up of an extensive petrochemical spill associated with the Hercules Oil and Gas Development Project located in Santa Barbara County.

Land Use and Public Policy Analyses and GIS Applications

- **Santa Barbara North County Siting Study.** Ms. Walker completed the land use analysis and oil and gas facility infrastructure "baseline" section for a siting and constraints study focused on the potential alternatives available for the construction and operation of a new consolidated oil and gas processing facility in northern Santa Barbara County, California.
- **Miramar Railroad Realignment.** Ms. Walker served as the Principal Investigator for the land use and public policy baseline, impacts, and constraints analyses for a rail line straightening and expansion project located in the northern portion of the City of San Diego. Analyses were completed for inclusion in both a "stand alone" environmental constraints study and EIR.
- **Mobil M-70 Pipeline Replacement Project.** Ms. Walker served as the Principal Investigator for the land use analysis, mapping, and impact assessment of a proposed 92-mile crude oil pipeline and alternatives between Lebec and Torrance, California. The effort included local and County public policy analysis of pipeline placement and operation requirements.
- **Las Vegas Valley Water District Cooperative Use Project.** Ms. Walker Principal conducted an image processing and spatial analysis of a series of LANDSAT satellite images to classify natural habitats and land use for the preliminary siting of an extensive network of water supply wells and pipelines throughout southern Nevada.
- **Kern County Valley Floor Habitat Conservation Plan.** Ms. Walker conducted an extensive habitat and land use air photo interpretation, mapping, and analysis of the western half of Kern County for inclusion in the Kern County Valley Floor Habitat Conservation Plan. The effort included mapping and analysis of the County's General Plan Land Use Element Goals and Policies, and County Zoning Ordinances.
- **Borax Mine Expansion.** Ms. Walker served as the Principal Investigator for the Project Description, Project Alternatives, and socioeconomic and land use analyses portions of an EA addressing a proposed expansion of the U.S. Borax Boron Mine facility, Kern County, California.
- **Clark County (Nevada) Flood Control District Master Plan EIS.** Ms. Walker prepared the Project Description, cumulative impacts, and land use analyses of the Clark County Flood Control District Master Plan EIS.
- **QAD Facility Expansion.** Ms. Walker Prepared the noise and land use analyses for a preliminary environmental assessment/screening for a proposed facility expansion of a light-industrial enterprise in Carpinteria, California. The task included local and Santa Barbara County analysis of General Plan and Zoning regulations related to land use development.
- **Santa Clara River Flood Control Improvements.** Ms. Walker served as the Principal Investigator for a detailed air photo interpretation, mapping, and quantification of predominant habitat types, land uses, and stream network patterns associated with the Santa Clarita Valley, California. Analysis

included impact assessment of a proposed series of regional flood control improvements of the Santa Clara River.

- **Dominigoni Valley Development Project.** Ms. Walker conducted an air photo interpretation, mapping, and analysis tracking the historic land uses, natural habitats, and stream network patterns associated with the Dominigoni Valley, California. The analysis was conducted to evaluate potential land development and its affects on local stream networks.
- **Geographic Information System Applications.** Ms. Walker has managed and/or implemented the design, development, and analysis of numerous multidisciplinary Geographic Information System (GIS) efforts, including: California Offshore Oil and Gas Energy Resources Study; Kern County Habitat Conservation Plan; Chevron Hawaii Refinery Pipeline Data Management System; Union Pacific–Southern Pacific Merger Application Environmental Analysis; Caltrans Route 41 Environmental Assessment Project; and, Nellis Air Force Base Integrated Natural Resources Management Plan.

PROFESSIONAL AFFILIATIONS

- Association of Environmental Professionals

CERTIFICATES/AWARDS

- Darkenwald Award for outstanding academic achievement by a first year graduate student (City University of New York, Department of Geography and Geology, 1987).


DECLARATION OF
Michael P. Donovan, P.G., C.Hg.

I, **Michael P. Donovan**, declare as follows:

1. I am presently under contract with Aspen Environmental Group to provide environmental technical assistance to the California Energy Commission. I am serving as a Senior Hydrogeologist and to provide Peak Workload Support for the Energy Facility Siting Program and for the Energy Planning Program.
2. My professional qualifications and experience are attached hereto and incorporated by reference herein.
3. I helped prepare the Staff Testimony and errata on **Soil and Water Resources** sections for the Ridgecrest Solar Power Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony and errata is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and errata and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: March 1, 2010

Signed: 

At: Santa Ana, California

Education

BS/1978/Geology/Oregon State University

Computer Modeling of Groundwater Flow and Contaminant Transport by Jacob Bear/University of California, Irvine

Registration

1986/California Registered Geologist #4112 (Expires 06/30/11)

2000/California Certified Hydrogeologist #701 (Expires 06/30/11)

Experience

With Psomas 5 years; with other firms for 24 years.

Background

Mr. Donovan is a professional hydrogeologist with over 29 years of experience in project management, hydrology and hydrogeological assessments, conceptual model development, groundwater modeling studies, water quality assessments, and groundwater resource development. He has extensive skills with monitoring well design, water quality sampling and analytical techniques, quality assurance/quality control, CEQA, environmental impact assessment, ecohydrology, agency negotiations, risk assessment, and expert witness.

Related Projects

San Juan Basin Authority (2004-Present): Senior Hydrogeologist – Hydrogeologic characterization and monitoring of groundwater extraction as part of desalination facility. Project includes implementation of groundwater monitoring plan including water quality sampling and analytical testing, groundwater modeling, monitoring of surface and groundwater levels and flow and assessments in change in storage to the alluvial groundwater basin from ongoing extraction wells. In addition, evaluated recharge of alluvial groundwater system using diverted stream channels and percolation basins for ongoing desalination project.

Metropolitan Water District of Southern California: Senior Hydrogeologist – Hydrogeologic characterization of bedrock geology in vicinity of proposed Pipeline No. 6 water conveyance tunnel. Work included development of monitoring plan including sampling protocols, laboratory analytical techniques, and quality assurance and quality control procedures.

Private Developer, Hydrogeologic Assessment (2004 to Present): Senior Hydrogeologist - Hydrogeologic characterization of Shaver Valley (east of Indio, CA) for potential conjunctive use project as part of major residential, commercial, and golf resort development in Eastern Riverside County. Work includes workplan development, geophysical investigation, well installation, aquifer testing, water quality assessment, groundwater modeling, conceptual design of groundwater recharge/extraction program, and providing documentation for Specific Plan and EIR.

Mission Springs Water District, Groundwater Modeling Study (2005-Present):

Senior Hydrogeologist –The work included potential historical impacts to regional groundwater system, potential reuse sites for recycled water, and recommendations for a Groundwater Management Plan.

Poseidon Resources, Hydrogeological Assessment: Senior Hydrogeologist – Preparation of Hydrogeological Assessment and Feasibility for the use of vertical extraction wells to supply feedwater for a desalination plant in Southern California. Evaluation included characterization of nearshore hydrogeological regime and design of extraction wells and potential drawdown field created by maximum feasible yield.

Mission Springs Water District, Preliminary Water Balance: Senior Hydrogeologist - Hydrogeologic characterization and water supply assessment for the Mission Springs Water District (MSWD) service area. The objective of this project is to develop a long term Integrated Water Resource Management Plan that can be used by MSWD to optimize the use of their groundwater basins and evaluate alternative water supplies. The alternatives developed must minimize impacts to biological and wildlife of concern by the local environmental community. As part of this project, Mr. Donovan completed a preliminary water balance study for the Mission Creek sub-basin. The results of the study would be used to direct future investigations for the Mission Creek sub-basin.

City of San Juan Capistrano (2007): Senior Hydrogeologist – Assisted the City of San Juan Capistrano in the evaluation of proposed well production sites including installation and testing of pilot test wells at two location. Evaluation included advancement of test borings using Sonic Drilling, well completion, aquifer test, water quality sampling, and preparation of Pilot Test Well Report that included suitability of each location and expected production from a production well placed at each location.

Elsinore Valley Municipal Water District (2006-2007): Senior Hydrogeologist - Meeks & Daley Water Company (M&D) and the City of Riverside constructed two new wells (in City of San Bernardino and Colton). Psomas was responsible for designing and preparing a preliminary design report, construction documents and project specifications for: two new +700-Foot deep wells with a vertical turbine pump assembly at an estimated flow rate of 3,000 GPM and associated piping. Mr. Donovan prepared a Mitigated Negative Declaration, Mitigation Monitoring and Reporting Program, required forms for submittal to State Clearing House, response letter to comments, and presentations to lead agency/public forum on the project.

East Orange County Water District (2008): Senior Hydrogeologist – EOCWD planned to construct a 900-foot deep well (in City of Tustin). Psomas was responsible for designing and preparing a preliminary design report, construction documents and project specifications for the new +900-Foot deep well with a vertical turbine pump assembly at an estimated flow rate of 2,000 GPM and associated piping. Mr. Donovan prepared a Mitigated Negative Declaration, Mitigation Monitoring and Reporting Program, required forms for submittal to State Clearing House, response letter to comments, and presentations to lead agency/public forum on the project.

Surface and Groundwater Assessment, Eastern Utah: Principal investigator for baseline surface water and groundwater assessment and impact monitoring of White

River Shale Corporation major oil shale mining project in eastern Utah. Responsible for locating over 8 surface water monitoring stations, streamflow monitoring (including static and continuous monitoring), development of rating curves for stream cross-sections, water quality sampling, reduction and analysis of data and development of a comprehensive data management system designed after the USGS WASTORE system over a period of seven years. In addition, developed a data quality management system that monitored and corrected deficiencies in the collection and reporting of the surface water quality data and later developed a statistical approach for evaluating mitigation monitoring for naturally-occurring compounds including metals and selected nutrients..

Surface Water Quality Monitoring, Southeast Alaska: Principal investigator for baseline surface water quality monitoring program for the Quartz Hill Molybdenum Project. Responsible for locating over 17 surface water monitoring stations, streamflow monitoring (including static and continuous monitoring), development of rating curves for stream cross-sections, water quality sampling (including storm-activated samplers), reduction and analysis of data and development of a comprehensive data management system designed after the USGS WASTORE system over a period of five years. In addition, developed a data quality management system that monitored and corrected deficiencies in the collection and reporting of the surface water quality data.

Surface Water Quality Monitoring, Thompson Creek Molybdenum Mine, Idaho: Principal investigator for baseline surface water quality monitoring program for a proposed fluorite mine project. Responsible for locating over 12 surface water monitoring stations, streamflow monitoring, water quality sampling, data analysis and reporting of the information over a period of two years.

Surface Water Quality Monitoring, Ima Mine, Idaho: Principal investigator for baseline surface water quality monitoring program for tungsten mine project. Responsible for locating over 5 surface water monitoring stations, streamflow monitoring, water quality sampling, data analysis and reporting of the information over a period of two years.

Surface Water Quality Monitoring, Bayhorse Creek Mine, Idaho: Principal investigator for baseline surface water quality monitoring program for a proposed fluorite mine project. Responsible for locating over 12 surface water monitoring stations, streamflow monitoring, water quality sampling, data analysis and reporting of the information over a period of two years.

Surface and Groundwater Quality Monitoring Program, Equity BX In-situ Oil Shale Mine, Colorado: Principal investigator for mitigation monitoring of surface water and groundwater quality during operation of a pilot test program for steam injection removal of oil from oil shale. Responsible for locating over 4 surface water and 8 groundwater monitoring stations, streamflow monitoring, water quality sampling, data analysis, impact evaluation and reporting of the information.

Surface Water Quality Monitoring, Creede, Colorado: Principal investigator for baseline surface water quality monitoring program for Chevron's proposed silver mine project. Responsible for locating over 12 surface water monitoring stations,

streamflow monitoring, water quality sampling, data analysis and reporting of the information.

Private Developer (2007): Principal Hydrogeologist. Evaluated the feasibility of constructing a golf course and adjacent housing complex on a closed landfill in Riverside County, California. The work included reviewing technical documents, meeting with regulators and developing issues environmental constraints list with recommendation for further study.

Valley Center Residential Project, CA (2005): Senior Hydrogeologist for hydrogeological characterization that included aquifer tests, water quality sampling and analysis, and numeric groundwater flow model development for a proposed residential development project in Valley Center. The project required analyzing the effect of wastewater effluent on the local groundwater aquifer and developing mitigation measures as required.

Sacramento Regional County Sanitation District, Peer Review – Hydrogeological Assessment: Project Manager/Senior Hydrogeologist – Conducted a review documents associated with the dewatering activities conducted during construction activities that occurred at the New Natomas Pump Station and evaluate whether “actual conditions are more adverse than baselines” were present. The evaluation included site walk, review of aquifer testing data and methods, dewatering activities, existing hydrogeological data and preparation of a report on findings.

Mission Springs Water District, Urban Water Management Plan: Senior Hydrogeologist – Preparation of the Hydrogeological portions of an Urban Water Management Plan in compliance with The California Water Management Planning Act of 1983, which required water purveyors to develop water management plans to achieve conservation and efficient use.

Remedial Investigation, Los Angeles, California: Senior Hydrogeologist and Project Manager responsible for interpreting existing information and developing a geologic and hydrogeologic evaluation program for a former chromium-plating facility. The facility is adjacent to a former major manufacturing facility that used chlorinated solvents and hexavalent chromium in its manufacturing operations. Responsibilities included reviewing historical site investigation activities, preparing a remedial investigation workplan, implementation of the workplan, commenting on adjacent facilities’ workplans, California Environmental Protection Agency DTSC meetings and negotiations, and formulating arguments/briefs for impending mediation.

Superfund Oversight, City of Industry, California: Senior Hydrogeologist responsible for participating as the client’s technical representative to the Puente Valley Operable Unit Steering Committee. Responsibilities included reviewing historical site investigation activities and preparing a de minimis argument for the client’s facility, assessing offsite liability stemming from adjacent responsible parties, reviewing proposed activities of the Steering Committee’s consultant, and formulating arguments/briefs for impending mediation.

Remedial Investigation, Redlands, California: Principal investigator for Lockheed Corporation, a rocket motor manufacturing and testing facility. The purpose was to identify potential source areas of TCE contamination. Areas evaluated included burn

pits, leachfields, vapor degreasing units, evaporation ponds, solid propellant mixing areas, rocket motor testing areas, and painting areas. The evaluation involved ranking the potential of various manufacturing activities to act as a source of TCE and evaluating available pathways into existing groundwater systems.

Site Investigation for Southern Pacific Pipeline. Palm Springs, California:

Senior project manager for a site investigation of a fuel leak for this major fuel product transport line. The site investigation included developing soil sampling and field screening techniques, shallow probe installation and groundwater monitoring well installation and sampling. The initial investigation culminated in development of potential remedial alternatives.

Xerox Corporation, Pomona, California: Senior Hydrogeologist for the design, implementation, and interpretation of a remedial investigation of a 12-acre former electronics manufacturing facility. Responsibilities included design and implementation of remedial investigations at the site, operation and maintenance of groundwater treatment system, groundwater monitoring, soil and groundwater cleanup evaluation, regulatory interaction, preparation of demolition specifications, bid documents, selection of subcontractor, and monitoring execution of the demolition program. In addition, provided technical support to outside legal counsel for civil liability lawsuit filed in association with the aforementioned site.

Recovery of Past Investigation Cost Claims, San Diego, California: Senior hydrogeologist for a client who was seeking reimbursement from a previous site operator for site investigation and remedial action costs. Reviewed with legal counsel the costs associated with various activities and segregated into costs that were viable for cost recovery. Provided testimony in court case and was successful in recovering 80% of past costs.

Redevelopment Project, San Diego, California: Project Manager responsible for the environmental assessment associated with the demolition of a bus maintenance facility and construction of multi-story apartment complex at a site severely impacted with petroleum hydrocarbons. The activities included reviewing prior site investigations conducted by five previous consulting firms, delineating areas of concern for excavation activities, conducting focused site investigations on the property, and formulating proposed alternatives for handling petroleum-contaminated soils during site construction.

Xerox Corporation, Santa Clara, Sunnyvale, & Hayward, California: Senior Hydrogeologist for the successful development and implementation of a site closure plan. Responsibilities included interpretation of hydrogeology and contaminant transport, groundwater monitoring, preparation of a site closure plan including hydrogeologic evaluation, fate and transport of chlorinated volatile organic compounds, and negotiations with the regulatory agencies.

Remedial Investigation, Carson, California: Program manager for remedial investigation/feasibility study at a 30-acre chemical-manufacturing site in southern California. The activities conducted at the site included soil vapor surveys, soil sampling, and groundwater sampling (three separate aquifer systems). The program also involved development of a feasibility study work plan, risk assessment evaluation, and public participation plan.

Remedial Investigation, Sacramento, California: Principal investigator for preliminary endangerment assessment and remedial investigation at a large aerospace facility. The 4,000- acre former rocket test facility is currently undergoing soil and groundwater investigations for potential releases of chlorinated solvents and metals. Responsible for developing the remedial investigation tasks and implementation.

Remedial Investigation/Feasibility Study, San Diego, California: Senior hydrogeologist responsible for design and implementation of all site characterization activities including design and implementation of the RI/RFI at a major gas turbine manufacturing facility. The work included assessment of soil and groundwater impacted with chlorinated solvents, metals, benzene, petroleum hydrocarbons and PCBs. Assisted in preparation of a comprehensive RI/RFI work plan that included a historical summary of facility operations, site geology and hydrogeology, and contaminants of concern, and the proposed site characterization activities to be undertaken. Site characterization activities included advancement of borings and completion of wells using hollow-stem auger and casing hammer reverse air circulation drilling; soil vapor surveys; geophysical investigations including electrical and seismic; continuous water level monitoring to correct for tidal influence; and laboratory analysis using CLP protocols.

Six Flags Magic Mountain, Hydrogeological Assessment (2005-2006): Senior Hydrogeologist – Assistance with permitting requirements associated with construction of a bank protection structure along the Santa Clara River in northern Los Angeles County. Work included assessment of hydrogeological regime including water quality, preparation of creekside dewatering permit and negotiations with RWQCB.

Fate and Transport Evaluation, San Diego, California: Senior hydrogeologist for the RI/RFI fate and transport evaluation to determine the necessity for implementing interim remedial measures for the transport of chlorinated volatile organic compounds and metals off-site into marine waters.

Feasibility Study, United States Navy, British Indian Ocean Territories, Indian Ocean (1984): Principal Investigator for enhancing development of groundwater resources on the island of Diego Garcia for the U.S. Rapid Deployment Force. The study included design and placement of horizontal infiltration galleries for development of a fresh groundwater lens.

Publications & Presentations

“Application Of Ecohydrology In Analysis And Minimization Of Development Impacts” Groundwater Resources Association of California 17th Annual Conference & Meeting; GROUNDWATER: Challenges to Meeting Our Future Needs. Sep. 25, 2008

“Hydrogeology of the San Diego Region on CD-ROM”
EnviroConcepts, Inc., March 2004.

“Hydrogeology of the Coastal Plain of Los Angeles on CD, Vol. II”
EnviroConcepts, Inc., March 2004.

“Hydrogeology of the San Fernando Valley on CD-ROM”
EnviroConcepts, Inc., August 2003.

“Hydrogeology of the Inland Plain of Los Angeles on CD-ROM”
EnviroConcepts, Inc., January 2003.

“Hydrogeology of the Coastal Plain of Los Angeles on CD, Vol. I”
EnviroConcepts, Inc., May 2002.

“Environmental Consultants’ Resource Handbook (California Edition).” 600 pp.
EnviroConcepts, Inc., March 1998.

“Environmental Consultants’ Resource Handbook (California Edition).” 561 pp.
EnviroConcepts, Inc., April 1995.

DECLARATION OF

Michael E. Daly, P.E

I, **Michael E. Daly**, declare as follows:

1. I am presently under contract with Aspen Environmental Group to provide environmental technical assistance to the California Energy Commission. I am serving as a Senior Engineer and to provide Peak Workload Support for the Energy Facility Siting Program and for the Energy Planning Program.
2. My professional qualifications and experience are attached hereto and incorporated by reference herein.
3. I helped prepare the Staff Testimony and errata on **Soil and Water Resources** sections for the Ridgecrest Solar Power Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony and errata is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and errata and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: February 18, 2010

Signed: _____



At: Tucson, AZ

Education

BS/1992/Hydrology and Water Resources/College of Engineering and Mines,
University of Arizona

Registration

1999/Arizona Registered Professional Engineer/33984
2002/California Registered Professional Engineer/63340

Affiliations

American Water Works Association
Tucson Utilities Contractors Association

Experience

With Psomas for 12 years, with other firms for 5 years.

Background

Mike Daly has more than 17 years of experience in the field of water resource design. He currently manages a five-person team, which completes a variety of project types including watershed and floodplain studies, flood control mitigation studies, sanitary sewer and storm drain planning and design, potable water system planning and design, and utility coordination modifications.

Projects

North Park Improvement Plans, Town of Sahuarita Public Works Department, Sahuarita, Arizona: Mike was project manager for this effort which included preparation of improvement plans for four new effluent infiltration ponds and an adjacent public park consisting of soccer and baseball facilities, playground, and large parking area. A key component of the project was the analysis of offsite flows which were modeled using the FLO-2D due to the topography of the floodplain. The results of the analysis were used to aid the design of the improvements and a proposed conditions model was created and to verify no adverse impacts to adjacent properties due to floodplain encroachment.

Pantano Wash/Kolb Road Permanent Soil Cement Bank Protection, Pima County Regional Flood Control District, Tucson, Arizona: Mike was the Project Manager for this project to develop and compile a basis of design report with alternatives analysis for a permanent bank protection and channel stabilization on the Pantano Wash ($Q_{100}=32,00$ cfs) between Speedway Boulevard and Tanque Verde Road. Services included hydrologic, hydraulic, and sediment transport analysis and documentation for each alternative, as well as geotechnical and structural stability analyses. Soil cement grade control structures were also designed to mitigate and stabilize the Pantano Wash channel and invert from continued head cutting within the project area. Mike is also managing the formal soil cement bank protection design for the project which is currently 90% complete.

Mission West Wash Flood Control Study, Pima County Regional Flood Control District, Pima County, Arizona: As Project Manager, Mike oversaw the hydrologic and hydraulic analysis to assess existing flooding conditions and examine several alternatives to mitigate potential flooding of the San Xavier Estates subdivision. The existing conditions HEC-2 model developed as part of the study was modified to look at the effectiveness of such alternatives as raising an existing berm, widening an existing diversion channel, and constructing a levee to FEMA standards. The option of employing upstream detention was also addressed. Preliminary cost estimates for the various mitigation alternatives were also provided.

Alamo Wash, City of Tucson, Arizona: As Project Manager, Mike's responsibilities included overseeing the re-mapping of the existing floodplain within the project limits using revised 100-year peak discharges. Finished floor elevations (FFE) were collected at all inhabitable structures within the existing FEMA floodplain to determine which structures could be removed from the effective floodplain based on their FFE. The results of the revised mapping and hydrologic analysis were submitted to FEMA in an application for a Letter of Map Revision (LOMR). Mike was also responsible for the preparation of formal design documents for the construction of bank protection for Alamo Wash from just upstream from the confluence with Van Buren Wash to the south side of Grant Road.

Drainage Erosion Mitigation Plan, Pima County Regional Flood Control District, Green Valley, Arizona: As Project Manager Mike contracted with Pima County Regional Flood Control District to provide an erosion mitigation plan at 16 distinct locations within Green Valley. The existing drainage system consists of numerous constructed drainage channels to convey large flows from natural upstream watersheds through developed areas and to the Santa Cruz River. Due to a lack of consideration of sediment transport characteristics during the original design, significant channel downcutting and bank mitigation has occurred in many of the drainageways. Psomas' scope of services included collection of survey data and the formulation of conceptual and formal design plans to be used by contractors to construct mitigation measures and correct existing erosion problems.

Master Drainage Plan, Phases I & II, Town of Sahuarita, Sahuarita, Arizona: As Project Manager, Mike was responsible for this multi-phased effort to identify, characterize, and establish mitigation alternatives for existing drainage problems within the town limits. The study focused on areas where development is occurring or is likely to occur and on the relationship between existing drainage patterns and the future infrastructure required to support this development. Specific tasks included peak discharge analysis, field reconnaissance, assessment of existing drainage infrastructure, conceptual plan development, and preliminary cost estimates.

San Xavier District Master Basin Study, Tohono O'odham Nation Pima County Flood Control District, Pima County, Arizona: As Project Hydrologist, Mike was responsible for the cooperative effort between Pima County and the Tohono O'odham Nation to identify and provide alternatives to mitigate widespread flooding and erosion problems at the reservation. The project scope of work included identification and documentation of existing problems, calculation of peak discharges using HEC-1 methodology, mapping of existing floodplains using HEC-2 methodology, and the

formulation of both structural and non-structural flood control alternatives, which were consistent with the Nation's long term goals and farm rehabilitation plan.

DECLARATION OF John R. Thornton P.E.

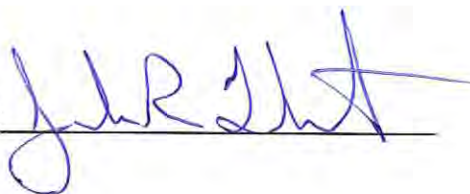
I, **John R. Thornton**, declare as follows:

1. I am presently under contract with Aspen Environmental Group to provide environmental technical assistance to the California Energy Commission. I am serving as a Senior Water Resource Engineer and to provide Peak Workload Support for the Energy Facility Siting Program and for the Energy Planning Program.
2. My professional qualifications and experience are attached hereto and incorporated by reference herein.
3. I helped prepare the Staff Testimony and errata on **Soil and Water Resources** sections for the Ridgecrest Solar Power Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony and errata is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and errata and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: March 1, 2010

Signed: _____



At: Santa Ana, California

Education

MS/1978/Civil and Environmental Engineering/California State University, Long Beach

BS/1969/Civil Engineering/California State Polytechnic University, Pomona

Registration

1974/Civil Engineer/California/#24251

1976/Agricultural Engineer/California/#145

1982/Civil Engineer/Nevada/#6160

1986/Civil Engineer/Idaho/#5379

1996/Civil Engineer/Arizona/#29954

2007/Civil Engineer/Utah/# 6674175-2202

Affiliations

Water Environment Federation

American Water Works Association

Orange County Water Association

Water Reuse (Vice President of Orange County Chapter)

Urban Water Institute (Member of Board of Directors)

Association of California Water Agency (Member of Groundwater Committee)

Experience

With Psomas for 14 years; with other firms for 27 years.

Background

Mr. Thornton has over 40 years of experience in the development and management of water resource projects ranging in scope and magnitude. He is an expert in the development and management of groundwater development and management projects. He has been in responsible charge of the preparation of feasibility studies and facilities master plans; preliminary and final design documents (construction drawings, specifications, and cost estimates); and construction supervision of canals, pipelines, wells, pump stations, reservoirs, reclaimed water use systems, and agricultural crop and landscaping irrigation facilities. He has also provided technical studies and expert witness testimony in complex water rights matters. The following are examples of projects he has been in principal charge:

Projects

San Juan Basin Authority, San Juan Capistrano, Ca (1990 to Present): District Engineer and Project Manager for the San Juan Basin Authority. Principal author of the 1994 groundwater management plan and water rights application that lead to obtaining a water Rights Permit to develop groundwater from the San Juan and Arroyo Trabuco Creeks and construction of the City of San Juan Capistrano's brackish water desalination plan. Successfully applied for and obtained four grants from CSWRCB. One of the grants was used to develop the Integrated Vegetation and Groundwater Monitoring Plan which was reviewed and accepted by the Division of Water Rights as meeting all of the

monitoring conditions of the water rights permit not only for the SJBA but also the requirements of the South Coast Water District Water Rights Permit. Implemented and provided overall management of the implementation of the Integrated Vegetation and Groundwater Monitoring Plan since its inception in 2004. Have successfully modified and or reduced several of the monitoring protocols as they were not applicable to the conditions within the monitoring area. Have provided water resource and engineering consulting expertise to the SJBA on numerous project since 1990.

Mission Springs Water District, Integrated Water Resource Plan: Principal in Charge to assist MSWD staff in the preparation of an Integrated Water Resource Plan and further develop a conceptual understanding of the conjunctive use and groundwater banking options potentially available in various locations within their service area. The first phase of the project focused on the development of a hydrologic water balance for the Mission Creek Sub-basin. Psomas' initial review resulted in the development of a comprehensive field investigation plan and implementation plan for a variety of alternatives that incorporated the water resource supply needs for future projected demands. The objective of the work effort was to address specific groundwater management options for the utilization and conservation of existing and potential water resources available to MSWD.

South Orange County Integrated Water Shed Management Plan: Principal in Charge of developing an IRWMP for South Orange County as part of the California Prop 50 and 84 bond financing program. The plan included the coordination of over 20 public agencies and stakeholders, the development of a plan with over 40 million dollars in projects largely related to water and wastewater development.

Antelope Valley Groundwater Banking Feasibility Study: Project Manager for investigating the feasibility of developing a conjunctive use project to facilitate the sale of State Project waters exchanged for banked groundwater in the westerly Antelope Valley of Los Angeles County. The banked groundwater would be sold to Los Angeles Department of Water and Power to replace water used for dust mitigation at the Owens Lake. The study reviewed the geologic, hydrogeologic, water supply, water quality, costs, environmental and institutional issues associates with the project; determined appropriate water supply, recharge, recovery and storage criteria; sized the facility and prepared cost estimates. A preliminary MODFLO model was developed. Operational criteria was developed for 20,000 to 40,000 acre feet per year of recharge, up to 40,000 acre feet of extraction, 200,000 acre feet of cumulative storage and service to and from both water supply facilities.

Hemet/San Jacinto Recharge and Recovery Program, Eastern Municipal Water District, CA: Project Director/Principal-in-Charge for the Eastern Municipal Water District Integrated Recharge and Recovery Program. Psomas worked with the EMWD and local stakeholders to evaluate the feasibility of using EMWD-owned property in the San Jacinto River bed as an integrated groundwater storage site. The feasibility program includes the analysis and evaluation of hydrogeologic properties, development of a regional groundwater model, preliminary design and location of proposed recharge basins and necessary facility infrastructure including extraction wells. In addition, coordination

coordination was provided for environmental support services for the EMWD overall Habitat Conservation Plan for this project and discussing the project with appropriate regulatory agencies such as the Army Corps of Engineers and United States Fish and Wildlife. The purpose of the proposed Program is to provide groundwater storage within the eastern portion of EMWD's service area (i.e., the Hemet/San Jacinto area).

Olancho Water Project, CA, Western Water Co: Project Manager for developing facilities and evaluating the feasibility of a water transfer project from the Southern Owens Valley, Owens Lake area. The project includes the development of a groundwater flow model (ModFlow) for approximately a fifty square mile area of the southern Owens Lake, evaluation of groundwater hydrogeology, evaluation of impacts to natural and cultural resources, location and preliminary design of facilities, including wells, pipelines and connection to the City of Los Angeles Owens Valley Aqueducts and overall project feasibility. Approximately 10,000 acre feet per year were estimated as feasible to extract from the groundwater without impacting farming, domestic water and natural resources. A complete EIR was developed including all necessary biological and cultural studies and initial processing through the planning department of Inyo County. A groundwater resource-monitoring plan was developed and implemented for monitoring water level and quality for over 20 wells in the surrounding area. The project was performed under careful review of the Inyo County Water Department.

Cadiz/Fenner Conjunctive Use and Storage Program, San Bernardino County, CA, Cadiz Land Co.: Project Manager for the development of preliminary engineering and economic analysis for a conjunctive use, water storage and transfer program located in Cadiz and Fenner Valleys of San Bernardino County. The project included 30 miles of large diameter pipeline. The Core Program could provide a dry-year water supply to the Metropolitan Water District of Southern California of up to 100,000-acre feet per year. The program concept is to convey Colorado River water from the Colorado River Aqueduct (CRA) to the Cadiz/Fenner area during periods of excess supply. The imported water would be stored in the local groundwater aquifer system. This water and indigenous groundwater would be extracted by wells and returned to the CRA during periods of drought.

DECLARATION OF Robert Fiore

I, **Robert Fiore** declare as follows:

1. I am presently employed by the California Energy Commission in the **Community Resources Unit** of the Energy Facilities Siting Division as a **Planner II**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on **Traffic and Transportation**, for the **Ridgecrest Solar Power Project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 3/18/10 Signed: Original signed by R. Fiore

At: Sacramento, California

Robert Fiore

EXPERIENCE & QUALIFICATIONS

Aug. 2008 - Present

PLANNER II

CALIFORNIA ENERGY COMMISSION

- Transportation, Visual Resource, Land Use and Socioeconomic Planning for the siting of power plant projects and transmission facilities;
- Prepare complex analysis of power plant projects and transmission facilities;

Oct. 2002 - March 2008

SENIOR PLANNING PROJECT MANAGER

FRAYJI DESIGN GROUP

- Assemble and lead project teams consisting of planners, engineers, architects, consultants and technicians to develop large-scale master planned communities;
- Direct projects from pre-acquisition, through site assessment and project approval, to construction by coordinating external and internal acquisition, planning, design and construction departments or consultants; Perform due diligence and site assessments;
- Calculate development costs and manage multi-million dollar project budgets;
- Solve problems related to site and infrastructure design, soils, traffic, environmental impacts, utility placement, housing, recreation, architecture, landscaping, rights-of-way, etc;

June 1998 – Aug. 2002

PLANNER/ FINANCIAL ANALYST

BERRYMAN & HENIGAR

- Power plant expansion, planning and permitting;
- Facility assessments and survey, total ownership costs, life cycle costs, alternatives evaluation and recommendations;
- Calculate costs/ apportionments and integrate databases;
- Ensure Federal, State and Local regulatory compliance;
- Perform trend analysis and forecasting, socio-economic data research, needs assessments, fiscal studies, infrastructure inventory analysis, fee studies and feasibility studies;

Jan. 1990 – Jan. 1998

PRINCIPAL REGIONAL PLANNER

LOS ANGELES COUNTY

- Wrote elements of the County's General Plan, Zoning Regulations and Development Standards; Wrote portions of EIR's and EIS's;
- Manage and/ or prepare reports analyzing impacts from development projects and ensure compliance with CEQA and NEPA and the CA Map Act;
- Major public infrastructure projects and expansion;
- Oversee the proper development of large-scale and multi-use development projects;
- Initiate and/ or oversee policy document development and prepare and interpret ordinances;
- Make presentations, manage meetings and engage community, staff and stakeholders;
- Problem solve through sound reason, judgment and expertise;
- Manage department budget and assign tasks; Hire and train junior staff and enable junior staff to meet goals; Ensure production and accountability;
- Capital improvement, aviation and emergency planning;
- Manage specific plan, land development regulation and design guideline preparation;
- Prepare reports for decision makers to report findings and make recommendations;
- Traffic studies, biological reports, cultural and historic reports and site and architectural design;
- Redevelopment near existing incorporated cities;

EDUCATION

Florida State University, 1985

B.S. Political Science and Urban Planning

DECLARATION OF

Dr.Obed Odoemelam

I, **Obed Odoemelam** declare as follows:

1. I am presently employed by the California Energy Commission in the Facilities Siting, Transmission, and Environmental Protection Division as a Staff Toxicologist.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff testimony on **Transmission Line safety and Nuisance** for the Ridgecrest Solar Power Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 03/15/10 Signed: Original signed by O. Odoemelam

At: Sacramento, California

RESUME

DR. OBED ODOEMELAM

EDUCATION:

1979-1981 University of California, Davis, California. Ph.D., Ecotoxicology
1976-1978 University of Wisconsin, Eau Claire, Wisconsin. M.S., Biology.
1972-1976 University of Wisconsin, Eau Claire, Wisconsin. B.S., Biology

EXPERIENCE:

1989

The Present: California Energy Commission. Staff Toxicologist.

Responsible for the technical oversight of staffs from all Divisions in the Commission as well as outside consultants or University researchers who manage or conduct multi-disciplinary research in support of Commission programs. Research is in the following program areas: Energy conservation-related indoor pollution, power plant-related outdoor pollution, power plant-related waste management, alternative fuels-related health effects, waste water treatment, and the health effects of electromagnetic fields. Serve as scientific adviser to Commissioners and Commission staff on issues related to energy conservation. Serve on statewide advisory panels on issues related to multiple chemical sensitivity, ventilation standards, electromagnetic field regulation, health risk assessment, and outdoor pollution control technology. Testify as an expert witness at Commission hearings and before the California legislature on health issues related to energy development and conservation. Review research proposals and findings for policy implications, interact with federal and state agencies and industry on the establishment of exposure limits for environmental pollutants, and prepare reports for publication.

1985-1989 California Energy Commission.

Responsible for assessing the potential impacts of criteria and noncriteria pollutants and hazardous wastes associated with the construction, operation and decommissioning of specific power plant projects. Testified before the Commission in the power plant certification process, and interacted with federal and state agencies on the establishment of environmental limits for air and water pollutants.

1983-1985 California Department of Food and Agriculture.

Environmental Health Specialist.

Evaluated pesticide registration data regarding the health and environmental effects of agricultural chemicals. Prepared reports for public information in connection with the eradication of specific agricultural pests in California.

DECLARATION OF

I, **Michael Clayton** declare as follows:

1. I am presently employed by the California Energy Commission in the Facilities Siting Office of the Systems Assessments and Facilities Siting Division as a Visual Resources Specialist.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff testimony and errata on **Visual Resources** for the **Ridgecrest Solar Power Project** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony and errata is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and errata and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 2/22/2010 Signed: Original signed by M. Clayton

At: Portland, Oregon

Michael Clayton & Associates

Visual Impact Assessment - Energy and Utility Planning - Environmental Impact Analysis

7645 SW Whitford Drive, Portland, OR 97223

Tel: (503) 244-9454 Fax: (503) 244-9455 E-mail: mc.mca@comcast.net

Resume for Michael Clayton

Michael Clayton has more than 30 years of experience in the fields of Visual Impact Assessment, Energy and Utility Planning, and Environmental Impact Analysis. Over the course of his experience, Mr. Clayton has conducted over 200 visual impact assessments using a variety of visual assessment methodologies for application to infrastructure and energy and resource development projects on both federal and non-federal public and private lands. Michael has extensive experience with the Bureau of Land Management's Visual Resource Management (VRM) System including conducting visual resource inventories, developing Interim VRM Classes, and conducting Contrast Rating analyses; the Forest Service's Visual Management System; the Forest Service's new Scenery Management System; and the California Energy Commission's Visual Resources Methodology. He has also developed and implemented the Visual Sensitivity – Visual Change (VS-VC) methodology for use on non-BLM and non-Forest public and private lands, which he has used on numerous electric transmission and product pipeline projects on behalf of the California Public Utilities Commission. Mr. Clayton also provides expert witness testimony with regard to Visual Resources Analysis on behalf of the State of California.

Mr. Clayton has conducted visual resource impact assessments for a variety of project types in varied landscapes including desert terrain; forested, mountainous areas; valleys of grazing land and agricultural uses; open plains; and urban and suburban areas. Visual impact assessments have been conducted for electric transmission lines and substations, power plants, projects involving substantial terrain modification, water conveyance and storage facilities, hydroelectric projects, pipelines, roads, telecommunications projects, and wastewater treatment plants, to name a few examples. In addition to conducting visual analyses, Mr. Clayton also prepares visual simulations to aid in the understanding of project impacts.

In 1991, the California Energy Commission (CEC) presented Michael Clayton with an *Outstanding Performance Award* for his preparation of twelve power plant project Visual Resources Staff Assessments as a consultant to the CEC. As part of that effort, Mr. Clayton reviewed power plant application visual studies and applicant-prepared VRM inventories. In 2004, Mr. Clayton was presented with an *Outstanding Environmental Analysis Document* award by the Association of Environmental Professionals for the Visual Resources analysis he prepared for the Jefferson-Martin 230 kV Transmission Line Project Environmental Impact Report.

EDUCATION

1996 M.A., Asia Pacific Environmental Affairs, University of San Francisco
1983 M.S., Environmental Management, University of San Francisco
1976 B.A., Biology, University of California at Los Angeles

VISUAL IMPACT ASSESSMENT REPRESENTATIVE PROJECTS

For the following representative projects, Michael Clayton was the sole author and visual analyst. Each study included a combination of information review and verification, agency consultation, field reconnaissance and analysis, establishment of key viewpoints, data mapping, photography (in most cases), data evaluation, and (in most cases) the preparation of visual simulations. Responsibilities also include the development of alternative routing options and tower locations (for transmission line projects) as well as the development of effective mitigation measures. For some projects involving federal lands administered by the U.S. Bureau of Land Management (BLM), Michael Clayton also prepared Visual Resource Management Inventories using the BLM's VRM methodology.

- **Solar Millennium Ridgecrest Solar Power Project.** Kern County, CA.
- **Haiwee Geothermal Lease Area VRM Inventory.** Kern County, CA.
- **Solar Millennium Blythe Solar Power Project.** Riverside County, CA.
- **Solar Millennium Palen Solar Power Project.** Riverside County, CA.
- **Sunrise Powerlink 500 kV/230 kV Transmission Line Project EIS/EIR Visual Analysis and VRM Inventory.** Imperial and San Diego Counties, CA.
- **Devers-Palo Verde 2 500 kV Transmission Line Project EIR/EIS Visual Analysis and VRM Inventory.** Riverside and San Bernardino Counties, CA; and Arizona.
- **Yuha Desert / West Mesa VRM Inventory.** Imperial County, CA.
- **El Casco Transmission System EIR Visual Analysis.** Riverside County, CA.
- **Emidio Lateral Pipeline Project SEIR/SEIS Visual Analysis.** Mojave, Los Angeles County, CA.
- **Ocotillo Energy Project Visual Resources Assessment.** Palm Springs, CA.
- **Combined Array for Research in Millimeter-Wave Astronomy (CARMA) Project EIS/EIR Visual Analysis.** White Mountains, Inyo County, CA.
- **Greater Chuckwalla Valley VRM Inventory.** Riverside County, CA.
- **Blythe I Power Plant Project Visual Analysis.** Blythe, CA.
- **La Rumorosa Wind Project Visual Analysis.** San Diego County, CA and Mexico.
- **North Umpqua Hydroelectric Project Aesthetics Management Plan Implementation.** Umpqua River, OR.
- **Alturas 345 kV Transmission Line Project EIR/EIS Visual Analysis.** Modoc and Lassen Counties, CA.
- **Yellowstone Pipeline Project EIS Visual Resources Specialist Report.** Montana and Idaho.
- **Stirling Energy Systems (SES) Solar Two Project Visual Analysis.** Imperial County, CA.
- **Blythe II Power Plant Project Visual Resources Assessment.** Blythe, CA.
- **Jefferson-Martin 230 kV Transmission Line Project EIR Visual Analysis.** San Francisco and San Mateo Counties, CA.
- **Mountainview Power Plant Project Visual Resources Assessment.** San Bernardino County, CA.

- **Borrego Springs Solar Thermal Project Visual Analysis.** San Diego County, CA.
- **Path 15 500 kV Transmission Line Project Supplemental Environmental Impact Report Visual Resources Analysis.** Merced and Fresno Counties, CA.
- **Coyote Creek 120 kV Powerline Extension Project Environmental Assessment Visual Resources Analysis.** Nevada.
- **Carma Project EIS/EIR Visual Analysis.** Inyo County, CA.
- **Palomar Energy Project Visual Resources Assessment.** Escondido, CA.
- **Pacific Pipeline Project EIR/EIS Visual Resources Impact Assessment.** Santa Barbara, Ventura, and Los Angeles Counties, CA.
- **Newmont Gold Company Mill No. 4, 120 kV Transmission Line/Substation Project NEPA Environmental Assessment Visual Resources Study.** Nevada.
- **Northeast San Jose Electric Transmission Reinforcement Project EIR Visual Resources Analysis.** Alameda and Santa Clara Counties, CA.
- **Viejo Transmission System Project Visual Analysis.** Orange County, CA.
- **Tri-Valley 230 kV 2002 Electric Transmission Capacity Increase Project EIR.** Alameda County, CA.
- **Barrick Mine 120 kV Transmission Line Project EA Visual Analysis.** Nevada.
- **Novato 60kV Transmission Line Relocation Project.** Marin County, CA.
- **SMUD Cosumnes Power Plant Project Visual Resources Assessment.** Sacramento County, CA
- **Atlantic-Del Mar Electric Transmission Reinforcement Project.** Sacramento County, CA.
- **FRM Getchell 120 kV Transmission Line Project Visual Resources Analysis.** Nevada.
- **Potrero Power Plant Project Visual Resources Assessment.** San Francisco, CA.
- **AMAX Mine 60 kV Transmission Line Project Visual Resources Analysis.** Nevada.
- **Level 3 Communications Project Statewide Initial Study Visual Resources Analysis.** California Statewide.
- **Morro Bay Power Plant Project Dry Cooling Visual Analysis.** Morro Bay, CA.
- **Hercules Wastewater Treatment Plant EIR Visual Assessment.** Hercules, CA.
- **Marinship Water Storage Tank Relocation Project Visual Impact Assessment.** Sausalito, CA.
- **Pastoria Power Plant Project Visual Resources Assessment.** Kern County, CA.
- **Inland Empire Power Plant Project Visual Resources Assessment.** Riverside County, CA.
- **Wind Mountain Mining, Inc. 60 kV Transmission Line Project Visual Analysis.** Nevada.
- **Blythe II Power Plant Project Visual Resources Assessment.** Blythe, CA.
- **Sprint Telecommunications Project Environmental Assessment Visual Analysis.** Nevada.
- **East Altamont Energy Center Visual Resources Assessment.** Alameda County, CA.
- **Zone 4 Water Distribution Project Visual Analysis.** Petaluma, CA.

- **Los Esteros Critical Energy Facility Visual Resources Assessment.** San Jose, CA.
- **MID Woodland No. 2 Power Plant Project Visual Resources Assessment.** Modesto, CA.
- **U.S. Air Force Claiborne Range EA Visual Analysis.** Louisiana and Texas.
- **ENPEX Power Plant Project Visual Analysis.** San Diego, CA.
- **Borrego Springs Peaker Power Plant Project Visual Analysis.** Borrego Springs, CA.

ENERGY AND UTILITY PLANNING

- Effective energy and utility planning promotes the development of long-range approaches for the sustainable use of energy, while facilitating the appropriate siting of energy facilities. Energy planning typically must consider energy need, available energy resources, facility siting constraints, and environmental protection. Michael Clayton has extensive experience in the preparation of energy planning and policy documents, and the conduct of facility siting studies.
- **Regional Energy Infrastructure Plans.** From 1985 to 1993, Mr. Clayton served as the Project Consultant for the *Western Regional Corridor Study*--the largest regional energy and telecommunications infrastructure inventory and analysis undertaken in the U.S. As Project Consultant, he was the Study's principal author and he coordinated the participation of 60 electric and gas utility, pipeline, and telecommunication companies, and over 250 jurisdictions of the U.S. Bureau of Land Management and U.S. Forest Service in the western U.S.
- **Energy Plans and Policy.** As the Project Consultant for the *Butte County General Plan Energy Element*, Mr. Clayton directed the development of long-range goals and policies for the development and conservation of energy resources. He also prepared the *Lassen County Energy Element*, which addresses the County's potential sources, production, transmission, use, and conservation of energy resources. This policy document also provides energy facility siting guidelines for the County evaluation of projects. Both of these energy elements were prepared under the auspices of the **California Energy Commission** Grant Program.
- **Energy Infrastructure Siting and Analysis.** Michael Clayton has also assisted in the siting and/or environmental analysis of more than 20 major energy generation and transmission projects in the U.S. including: *Keno-Cottonwood 500 kV Transmission Line Feasibility Study*, *FRM Getchell Transmission Line EA*, *Third Pacific Intertie 500 kV Transmission Line Feasibility Study*, *Trans-Sierra 500 kV Intertie Feasibility Study*, *Newmont Mill No. 4 120 kV Transmission Line Project*, and *California-Oregon Transmission Line Project*.

Additional examples of Energy and Utility Projects include the following:

- **Northern California Corridor Study.** Michael Clayton was the Project Manager and Principal Author for a study of approximately 2,400 miles of potential utility corridors in northern California, crossing the Sierra Nevada Mountains to Nevada and the Central Valley and Cascade Mountains to southern Oregon. Mr. Clayton had primary responsibility for all phases of the project including: identification of permit requirements; federal, state, and local agency consultations; evaluation of the existing land use and environmental characteristics of each corridor; and report preparation.
- **Gulf Coast Geopressured-Geothermal Resource Analysis.** Michael Clayton was the Ecosystem Analysis Project Manager for the U.S. Department of Energy Gulf Coast Geopressured Geothermal Resource Development Environmental Evaluation Texas and Louisiana Gulf Coastal Area Project. Mr. Clayton was responsible for the ecosystem impact

analysis, which focused on the cause and effect relationships among surface subsidence phenomena, surficial processes and key indicator organisms. The study covered four extraction sites within the Texas and Louisiana Gulf coastal region. Areas of particular concern included: loss of wetland habitat due to inundation, impoundment, drainage, and alteration of sedimentation patterns; loss or alteration of critical breeding and nursery habitat for commercial wetland and estuarine species; and reduced storm buffering potential due to loss of chenier-ridge and barrier strandplain habitat.

- **Central California Environmental and Land Use Inventory.** Michael Clayton was retained by Pacific Gas and Electric Company to develop a technical methodology for the compilation, evaluation, and mapping of a comprehensive environmental and land use inventory of the entire San Joaquin Valley in central California. The Inventory was designed to serve as an environmental database of sufficient detail to support the environmental analysis of a variety of project types, including major bulk electric transmission line projects, small electric transmission line feasibility studies, and siting of substations, service centers, and other utility facilities. Michael Clayton was the Project Manager and Principal Author.
- **Sprint Telecommunications Project Environmental Assessment.** Michael Clayton was the Project Manager and Principal Author for an Environmental Assessment on the construction of four power lines to US Sprint telecommunications repeater stations. The powerlines ranged from 200 feet to 20 miles in length. All proposed routes paralleled the Union Pacific Railroad. The major concerns addressed in the EA were adverse visual impacts on a Wilderness Study Area, loss of rare plant species, collision and electrocution of raptors, and impacts to cultural resources.

ENVIRONMENTAL IMPACT ANALYSIS

- Michael Clayton has managed more than 80 multi-disciplinary environmental impact assessments for a wide variety of projects including hydroelectric facilities; electric transmission lines; oil and gas pipelines; water storage and conveyance facilities; wastewater treatment plants; harbor facilities; roads; and residential, commercial and industrial facilities. He has authored Environmental Impact Statements (EIS), Reports (EIR) and Assessments (EA), Feasibility Studies and Mitigation Monitoring Programs. Project Examples include:
- **Coyote Creek Substation / 120 kV Transmission Line Project NEPA EA.** Michael Clayton prepared an Environmental Assessment for a 10-mile, 120 kV electric transmission line and construction of the Coyote Creek Substation. The line was needed to provide additional electrical power to an expanding load center in northern Nevada. The EA evaluated four alternative routes and the substation site. Major issues addressed in the EA included land use compatibility, visual resources, and loss and degradation of wildlife habitat. Mr. Clayton also prepared an environmental document for the Nevada Public Services Commission that described the purpose and need for the project and identified the potential impacts of the proposed substation.
- **Hydroelectric Project Licensing.** Mr. Clayton coordinated the preparation of a Federal Energy Regulatory Commission (FERC) Application for New License for the Haas-Kings River Project in California. The project included two dams and storage reservoirs, three power houses, diversion dams, penstocks, 70 kV and 230 kV transmission lines, and access roads. His responsibilities included: review of all agency letters of deficiency on a previous Application; development of a strategy for successful reapplication/licensing; development of the outline for the Environmental Report; preparation of technical author guidelines; analysis and integration of all contributor input, department comments, and agency recommendations into the Environmental Report; and review of all sections for adequacy.

- **Lakeville Highway NEPA Environmental Assessment.** Michael Clayton was retained to prepare an EA for a highway improvement project. The major issues addressed in the Environmental Assessment included: loss of wetland habitat, hazardous materials within the right of way, impacts on existing traffic during construction, incompatibility with adjacent sensitive uses, and visual impacts.
- **Las Positas College Expansion Project EIR and Environmental Compliance Monitoring.** Michael Clayton was retained by the Chabot-Las Positas Community College District (District) to prepare and EIR for the expansion of Las Positas College. The proposed project consisted of classroom and administrative facilities, an indoor/outdoor physical education complex, storage and service facilities, and supportive road and utility infrastructure. Key issues evaluated in the EIR included visual resources, drainage, biological resources, public services and utilities, and traffic and circulation. Michael Clayton also conducted all environmental permitting and agency consultation activities for the District including obtaining USACOE 404 Permit, RWQCB Water Quality Certification, CDF&G Streambed Alteration Agreement, USFWS Consultations under the Endangered Species Act, and implemented the Las Positas College Expansion Project Mitigation Monitoring Program.
- **Los Banos - Gates 500 kV Transmission Line Project EIR/EIS.** Michael Clayton was retained by Pacific Gas and Electric Company to provide technical management services for the preparation of an EIR/EIS for the Los Banos-Gates 500 kV Transmission Line Project--an 80-mile electric transmission line project developed as part of the California-Oregon Transmission Line Project. Mr. Clayton prepared the corridor and routing evaluation guidelines and environmental document preparation guidelines; coordinated preparation of constraint/opportunity maps and analyses; and authored the sections on Alternatives Analysis, Regulatory Compliance, Water Resources, and Recreation.
- **U.S. Air Force Strategic Training Range Complex NEPA Environmental Assessment.** Michael Clayton was retained by a defense contractor to prepare an environmental baseline inventory and environmental assessment for the modification of 15 low-level flight routes for B-52, B-1B, and FB-111 aircraft in the Strategic Training Range Complex in North Dakota, South Dakota, Nebraska, and Wyoming. Michael Clayton was the principal author of the EA, which involved collecting, compiling, and analyzing a large volume of resource information across four states. The EA process also involved extensive consultation with federal and state agency personnel.
- **West Marin Landfill EIR Project Description.** Michael Clayton was retained by West Marin Landfill to prepare an extensive Project Description and Permit Application for a major expansion of the landfill. This effort required the assimilation of an extensive project record including permit and environmental documentation, permit and land use histories, and design and operation plans. In this role, Mr. Clayton was also responsible for coordinating consultations with, and review by, state and local permitting agencies and compiling a Site Conditions Report to support a subsequent Environmental Impact Report.
- **Zone 14 Water Distribution Project Expanded Initial Study.** Michael Clayton was retained to prepare an Expanded Initial Study for a water pipeline project to improve water pressure to the City of Petaluma, California. The project involved three pipeline corridors, two pumping stations, and two water reservoirs. The major concerns addressed in the Initial Study were adverse visual impacts of the water tanks and pumping stations; right of way limitations; removal of marsh vegetation; disturbance to wildlife; generation of dust and

DECLARATION OF SHAHAB KHOSHMAHRAB

I, **SHAHAB KHOSHMAHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Facilities Siting Division as a **MECHANICAL ENGINEER**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I participated in the preparation of the staff testimony on **Facility Design** for the **Ridgecrest Solar Power Project** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: February 18, 2010

Signed: Original signed by: S. Khoshmashrab

At: Sacramento, California

DECLARATION OF SHAHAB KHOSHMAHRAB

I, **SHAHAB KHOSHMAHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Facilities Siting Division as a **MECHANICAL ENGINEER**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I participated in the preparation of the staff testimony on **Power Plant Efficiency** for the **Ridgecrest Solar Power Project** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: February 18, 2010

Signed: Original signed by: S. Khoshmashrab

At: Sacramento, California

DECLARATION OF SHAHAB KHOSHMAHRAB

I, **SHAHAB KHOSHMAHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Facilities Siting Division as a **MECHANICAL ENGINEER**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I participated in the preparation of the staff testimony on **Power Plant Reliability** for the **Ridgecrest Solar Power Project** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: February 18, 2010

Signed: Original signed by: S. Khoshmashrab

At: Sacramento, California

Shahab Khoshmashrab
Mechanical Engineer

Experience Summary

Nine years experience in the Mechanical, Civil, Structural, and Manufacturing Engineering fields involving engineering and manufacturing of various mechanical components and building structures. This experience includes QA/QC, construction/licensing of electric generating power plants, analysis of noise pollution, and engineering and policy analysis of thermal power plant regulatory issues.

Education

- California State University, Sacramento-- Bachelor of Science, Mechanical Engineering
- Registered Professional Engineer (Mechanical), California

Professional Experience

2001-2004--Mechanical Engineer, Systems Assessment and Facilities Siting-- California Energy Commission

Performed analysis of generating capacity, reliability, efficiency, noise and vibration, and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases.

1998-2001--Structural Engineer -- Rankin & Rankin

Engineered concrete foundations, structural steel and sheet metal of various building structures including energy related structures such as fuel islands. Performed energy analysis/calculations of such structures and produced structural engineering detail drawings.

1995-1998--Manufacturing Engineer -- Carpenter Advanced Technologies

Managed manufacturing projects of various mechanical components used in high tech medical and engineering equipment. Directed fabrication and inspection of first articles. Wrote and implemented QA/QC procedures and occupational safety procedures. Conducted developmental research of the most advanced manufacturing machines and processes including writing of formal reports. Developed project cost analysis. Developed/improved manufacturing processes.

DECLARATION OF

Testimony of Dal Hunter, Ph.D., C.E.G.

I, **Dal Hunter, Ph.D., C.E.G.**, declare as follows:

1. I am presently employed as a subcontractor to Aspen Environmental Group, a contractor to the California Energy Commission, Systems Assessment and Facilities Siting Division, as an Engineering Geologist.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff testimony on **GEOLOGY AND PALEONTOLOGY** for the **Ridgecrest Solar Power Project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: February 16, 2010

Signed:  2.16.10

At: Black Eagle Consulting, Inc.
Reno, Nevada



24 3.31.11

Robert D. Hunter, Ph.D., C.E.G.

Engineering Geologist

Vice President

Education

- Ph.D. – Geology – 1989 – University of Nevada, Reno
- M.S. – Geology – 1976 – University of California - Riverside
- B.S. – Geology – 1972 – California State University, Fullerton

Registrations

- Professional Geological Engineer – Nevada
- Registered Geologist – California
- Certified Engineering Geologist – California

Experience

1997 to Present: Black Eagle Consulting, Inc.; Vice President. Dr. Hunter is in charge of all phases of geochemical, geological, and geotechnical projects and is responsible for conducting, coordinating, and supervising geotechnical investigations for public and private sector clients. He is very familiar with design specifications and state and federal requirements.

Dr. Hunter has also provided geological, geotechnical, and paleontological review and written and oral testimony for California Energy Commission (CEC) power plant projects including:

- El Segundo Power Redevelopment Project (Coastal)
- Magnolia Power Project (including compliance monitoring)
- Ocotillo Energy Project (Wind Turbines)
- Vernon-Malburg Generating Station
- Inland Empire Energy Center (including testimony and compliance monitoring)
- Palomar Energy Project
- Henrietta Peaker Project
- East Altamont Energy Center
- Avenal Energy Center
- Teayawa Energy Center monitoring
- Walnut Energy Center (including compliance monitoring)
- Riverside Energy Resource Center
- Salton Sea Unit 6 (Geothermal Turbines)
- National Modoc Power Plant
- Pastoria Energy Center
- Otay Mesa Generating Project (compliance monitoring)
- Mountainview Power Plant Project (compliance)
- Consumes Power plant (compliance monitoring)
- Sunrise Power Project (compliance monitoring)

Attended Expert Witness Training Sponsored by CEC.

1978 to 1997: SEA, Incorporated; Geotechnical Manager, Engineering Geologist. Dr. Hunter was in charge of all phases of geotechnical projects for SEA, including project coordination and supervision, field exploration, geotechnical analysis, slope stability analysis, soil mechanics, engineering geochemistry, mineral and aggregate evaluations, and report preparation. Numerous investigations were undertaken on military, commercial, industrial, airport, residential, and roadway projects. He worked on many geothermal power plants, providing expertise in foundations design, slope stability, seismic assessment, geothermal hazard evaluation, expansive clay, and settlement problems. Project types included high-rise structures, airports, warehouses, shopping centers, apartments, subdivisions, storage tanks, roadways, mineral and aggregate evaluations, slope stability analyses, and fault studies.

1977 to 1978: Fugro (Ertec) Incorporated Consulting Engineers and Geologists; Staff Engineering Geologist; Long Beach, California.

Affiliations

- Association of Engineering Geologists

Publications

- Hunter, 1988, *Lime Induced Heave in Sulfate Bearing Clay Soils*, Journal of Geotechnical Engineering, ASCE, Vol. 14, No. 2, pp. 150-167.
- Hunter, 1989, *Applications of Stable Isotope Geochemistry in Engineering Geology*: Proceedings of the 25th Annual Symposium on Engineering Geology and Geotechnical Engineering.
- Hunter, 1993, *Evaluation of Potential Settlement Problems Related to Salt Dissolution in Foundation Soils*: Proceedings of the 29th Annual Symposium on Engineering Geology and Geotechnical Engineering.

DECLARATION OF AJOY GUHA

I, **Ajoy Guha**, declare as follows:

1. I am presently employed by the California Energy Commission in the **Transmission System Engineering unit** of the Siting, Transmission and Environmental Protection Division as an Associate Electrical Engineer.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff testimony on **Transmission System Engineering**, for the **Ridgecrest Solar Power Project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 3/19/10 Signed: Original signed by A. Guha

At: Sacramento, California

RESUME

AJOY GUHA
Associate Electrical Engineer
California Energy Commission
1516 Ninth Street, MS 46
Sacramento, CA 95814

EDUCATION:

MSEE, POWER SYSTEMS ENGINEERING, PURDUE UNIVERSITY, INDIANA
BSEE, ELECTRICAL ENGINEERING, CALCUTTA UNIVERSITY, INDIA

CERTIFICATIONS:

REGISTERED PROFESSIONAL ENGINEER, CALIFORNIA, INDIANA & ILLINOIS
MEMBER OF IEEE; MEMBER OF THE INSTITUTION OF ENGINEERS OF INDIA

SUMMARY OF PROFESSIONAL BACKGROUND:

Ajoy Guha, P. E. has 34 years of electric utility experience with an extensive background in evaluating and determining current and potential transmission system reliability problems and their cost effective solutions. He has a good understanding of the transmission issues and concerns. He is proficient in utilizing computer models of electrical systems in performing power flow, dynamic stability and short circuit studies, and provide system evaluations and solutions, and had performed generator interconnection studies, area transfer and interconnected transmission studies, and prepared five year transmission alternate plans and annual operating plans. He is also experienced in utilizing Integrated Resource Planning computer models for generation production costing and long term resource plans, and had worked as an Executive in electric utilities and experienced in construction, operation, maintenance and standardization of transmission and distribution lines.

WORK EXPERIENCE:

CALIFORNIA ENERGY COMMISSION, ENERGY FACILITIES SITING AND ENVIRONMENTAL DIVISION, SACRAMENTO, CA, 11/2000-Present.

Working as Associate Electrical Engineer in the Transmission System Engineering unit on licensing generation projects. Work involves evaluating generation interconnection studies and their impacts on transmission system, and providing staff assessments and testimony to the commission, and coordination with utilities and other agencies.

ALLIANT ENERGY, DELIVERY SYSTEM PLANNING, MADISON, WI, 4/2000-9/2000.

Worked as Transmission Services Engineer, performed Generator Interconnection studies and system planning studies.

IMPERIAL IRRIGATION DISTRICT, POWER DEPT., Imperial, California, 1985-1998.

Worked as Senior Planning Engineer in a supervisory position and in Transmission, Distribution and Integrated Resource planning areas. Performed interconnection studies for 500 MW geothermal plants and developed plan for a collector system, developed methodologies for transmission service charges, scheduling fees and losses. Worked as the Project Leader in the 1992 Electricity Report (ER 92) process of the California Energy Commission. Worked as the Project Leader for installation of an engineering computer system and softwares. Assumed the Project Lead in the standardization of construction and materials, and published construction standards.

CITY LIGHT & POWER, Frankfort, Indiana, 1980 – 1985.

Worked as Assistant Superintendent and managed engineering, construction and operation depts.

WESTERN ILLINOIS POWER CO-OP., Jacksonville, Illinois, 1978 – 1980.

Worked as Planning Engineer and was involved in transmission system planning.

THE CALCUTTA ELECTRIC SUPPLY CORPORATION LTD. (CESC), Calcutta, India, 1964 –1978.

Worked as District Engineer and was responsible for managing customer relations, purchasing and stores, system planning, construction, operation and maintenance departments of the most industrialized Transmission and Distribution division of the Utility. Worked as PROJECT MANAGER for construction of a 30 mile Double Circuit 132 kV gas-filled Underground Cable urban project. During 1961-63, worked as Factory Engineer for design, manufacturing and testing of transformers, motor starters and worked in a coal-fired generating plant.

DECLARATION OF Mark Hesters

I, **Mark Hesters**, declare as follows:

1. I am presently employed by The California Energy Commission in the **Siting, Transmission and Environmental Protection Division** as a Senior Electrical Engineer.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on **Transmission System Engineering**, for the **Ridgecrest Solar Power Plant**, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 3/19/10 Signed: Original signed by M. Hesters

At: Sacramento, CA

Mark Hesters

916-654-5049

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Qualifications

- Analyzed the reliability impacts of electric power plants for nine years.
- As an expert witness, produced written and oral testimony in numerous California Energy Commission proceedings on power plant licensing.
- Expertise in power flow models (GE PSLF and PowerWorld), production cost models (GE MAPS), Microsoft word-processing, spreadsheet and database programs.
- Contributing author to many California Energy Commission reports.
- Represented the Energy Commission in the development of electric reliability and planning standards for California.

Experience

Senior Electrical Engineer

2005-Present California Energy Commission, Sacramento, CA

- Program manager of the transmission system engineering analysis for new generator Applications of Certification.
- Lead the development of transmission data collection regulations.
- Overhauled the transmission data adequacy regulations for the Energy Commission's power plant certification process.
- Participated in the analysis of regional transmission projects.
- Technical lead for Commission in regional planning groups.
- Energy Commission representative to the Western Electric Coordinating Council Operations Committee.

Associate Electrical Engineer

1998–2005 California Energy Commission, Sacramento, CA

- Lead transmission systems analyst for power plant licensing under 12-month, 6-month and 21-day licensing processes.
- Provided expert witness testimony on the potential transmission impacts of new power plants in California Energy Commission licensing hearings.
- Authored chapters for California Energy Commission staff reports on regional transmission issues.
- Studied the economics of transmission projects using electricity production simulation tools.
- Analyzed transmission systems using the GE PSLF and PowerWorld load flow models.
- Collected and evaluated transmission data for California and the Western United States

Electric Generation Systems Specialist

1990–1998 California Energy Commission, Sacramento, CA

- Lead generation planner for southern California utilities.
- Analyzed electric generation systems using complex simulation tools.
- Provided analysis on the impact of resource plans on air quality and electricity costs for California Energy Commission reports.
- Developed modeling characteristics for emerging technologies.
- Evaluated resource plans.

Education

1985–1989 University of California at Davis

Davis, CA

- B.S., Environmental Policy Analysis and Planning

**DECLARATION OF
Dale Rundquist**

I, Dale Rundquist declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as a Compliance Project Manager.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on the General Conditions Including Compliance Monitoring and Closure Plan for the Ridgecrest Solar Power Project (09-AFC-9) Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 3/19/10

Signed: Original signed by D. Rundquist

At: Sacramento, California

DALE RUNDQUIST
Compliance Project Manager

EXPERIENCE SUMMARY

Over 30 years in project and staff management experience with the California Energy Commission (CEC), Bel Air Markets, and the US Army. Extensive experience in managing people and projects, and resolving difficult situations.

PROFESSIONAL EXPERIENCE AND EDUCATION

ENERGY COMMISSION COMPLIANCE PROJECT MANAGER 09/07 to Present
Worked as a Compliance Project Manager (CPM) for the California Energy Commission, in the Compliance Unit of the Siting, Transmission and Environmental Protection Division. Monitored the construction of two power plant projects (Inland Empire (01-AFC-17C) and Panoche Energy Center (06-AFC-5C)), and the operation of several other power plants (ACE (86-AFC-1C), Bottle Rock Geothermal (79-AFC-4C), Crockett Cogeneration (92-AFC-1C), Midway Sunset Cogeneration (85-AFC-3C), and Palomar Energy Project (01-AFC-24C)).

MANAGER/SUPERVISOR FOR BEL AIR MARKETS 11/74 to 09/07
Worked for Bel Air Markets for over thirty-two years starting on Night Stock Crew. Worked in a management capacity for twenty-eight years. Worked at several stores throughout the greater Sacramento area, managing 4 stores. Involved in scheduling employees, projecting sales on a weekly, monthly and yearly basis, resolving employee/customer disputes, controlling labor, developing business plans, ordering merchandise, and overall operation of the entire store.

US ARMY 02/69 to 02/71
Infantry Sergeant; Fort Lewis, Washington, Viet Nam.

EDUCATION 09/63 to 06/74
Bachelor of Arts Degree in Biological Sciences and a Minor Degree in Business Administration from California State University, Sacramento (1974).

APPENDIX 1

SCOPING REPORT

APPENDIX 1



**United States Department of the Interior
Bureau of Land Management
Ridgecrest Field Office**

**Solar Millennium LLC
Ridgecrest Solar Power Project
BLM File # CACA-049016**

SCOPING REPORT

RESULTS OF SCOPING

January 2010

Ridgecrest Field Office
300 S. Richmond Road
Ridgecrest, CA 93555
Hector Villalobos
Field Manager

Solar Millennium Ridgecrest Solar Power Project

I. Introduction

A. Brief Description of the Project

The project proposed by Solar Millennium, LLC, (applicant) is to construct, operate, maintain and terminate, the Ridgecrest Solar Power Project (RSPP), a utility scale parabolic trough solar thermal electric generating station. The proposed development is to provide approximately 250 megawatt (MW) capable of supplying enough renewable electricity for approximately 75, 000 homes or about 300,000 people.

If approved, the RSPP would be located on Bureau of Land Management (BLM) administered land five-miles west of the city of Ridgecrest, in Kern County, California. The actual proposed project site is located north and south of Brown's Road and southwest of U.S. Route 395.

The applicant applied for an amended right-of-way (ROW) to include approximately 1,448 acres for the facility footprint, which encompasses the area within the facility fence line. The disturbance area, which includes areas inside and outside of the facility fence line, is approximately 1,944 acres within an overall Project ROW area of 3,995 acres. The current access for the project is Brown Road. (See Figure 1: Project Location Map).

The project would interconnect with Southern California Edison's (SCE) existing 230 kV transmission line. A 230 kV switchyard (substation) is proposed to be constructed near the transmission lines on the south side of Brown Road at the Northwest corner of the Southern Solar field.

The Project would utilize solar parabolic trough technology to generate electricity. With this technology, arrays of parabolic mirrors collect radiant energy from the sun and refocus the energy on a receiver tube located at the focal point of the parabola. Through this process, a heat transfer fluid (HTF) is heated to high temperature (approx. 750°F) and piped through heat exchangers where it is used to generate high-pressure steam. The steam is then fed to a traditional steam turbine generator to generate electricity.

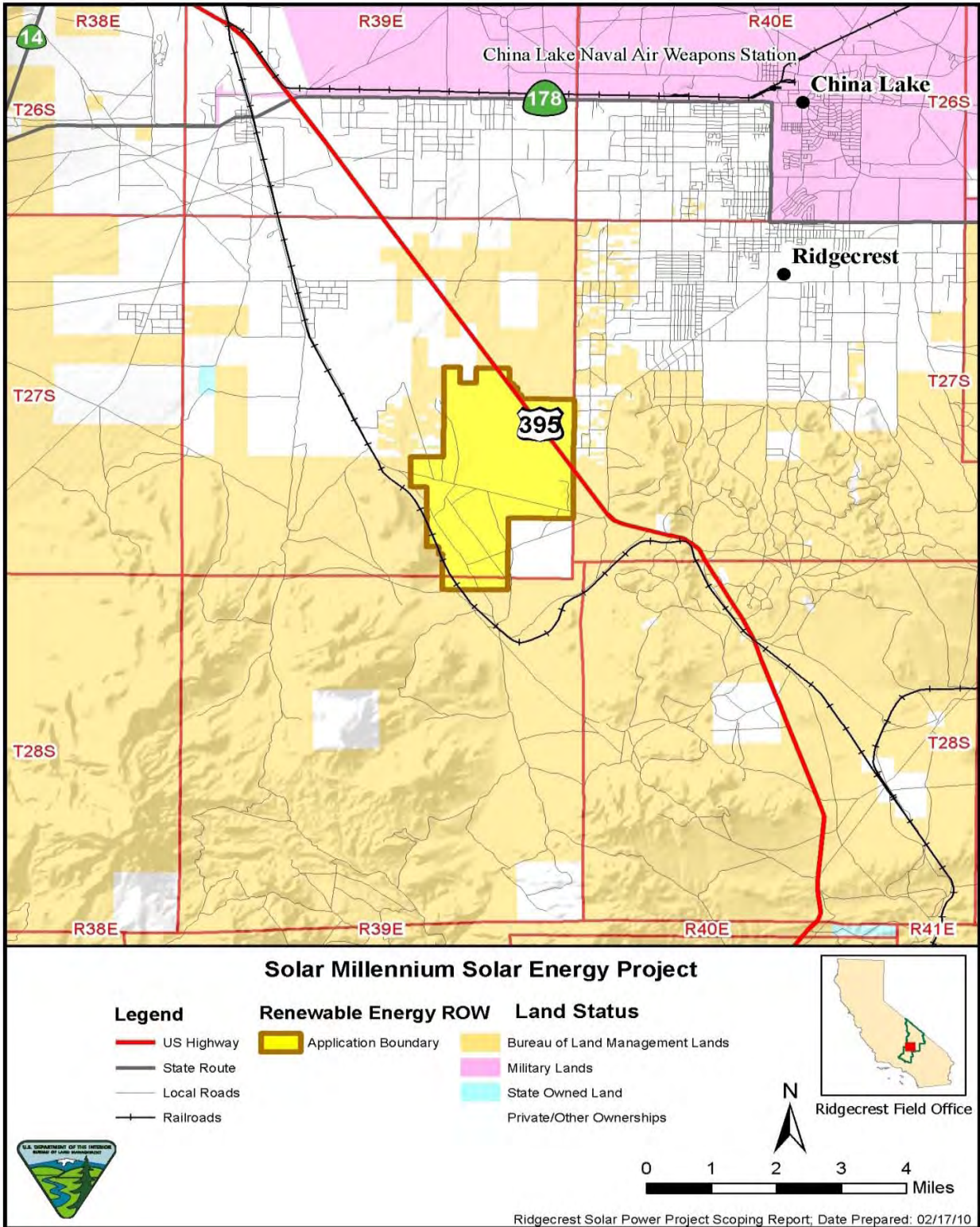


Figure 1: Project Location

B. Potential Land Use Plan Amendment to the California Desert Conservation Area Plan

The Project would be located on land that is subject to the BLM's California Desert Conservation Area (CDCA) Plan. All of the public lands in the CDCA under BLM management and have been designated geographically as Multiple Use Class's (MUC) as follows: Controlled Use (C), Limited Use (L), Moderate Use (M), and Intensive Use (I). Scattered and isolated parcels of public land in the CDCA which have not been placed within multiple-use classes are unclassified land. These parcels will be managed on a case-by-case basis. The proposed Project would be located on both unclassified lands and class L lands. For class L lands, wind and solar electric generation facilities may be allowed after National Environmental Policy Act (NEPA) requirements are met. The CDCA also states that sites associated with power generation or transmission not identified in the CDCA will be considered through the Plan Amendment process. The Project site is currently not identified in the CDCA. Therefore prior to ROW grant issuance, the Project would require a Land Use Plan Amendment to the CDCA.

C. Purpose and Need for the Project

The Proponent proposes to assist the State of California in meeting the State of California Renewable Portfolio Standard Program goals and reduce greenhouse gases by developing a 242 (250) megawatt solar parabolic energy production plant and related facilities in Kern County, California on Bureau of Land Management (BLM) administered lands.

BLM's purpose and need for the Solar project is to respond to the Proponent's application under Title V of the Federal Land Policy and Management Act of 1976 (43 USC 1761) for a right-of-way grant to construct, operate and decommission a solar parabolic facility on BLM lands. BLM will consider alternatives to the Proponent's proposed action and will include terms and conditions. If BLM decides to approve issuance of a ROW grant to the Proponent, BLM's actions would include amending the California Desert Conservation Area Plan concurrently. BLM will take into consideration the provisions of the Energy Policy Act of 2005 in responding to the Proponent's application.

D. Agency Coordination

D.1 Lead Agency

The California Energy Commission (CEC) is responsible for licensing solar parabolic projects that are 50 MW and larger. Therefore, the Project is also under the jurisdiction of the CEC. The Applicant submitted an Application for Certification (AFC) for the Project to the CEC on September 1, 2009 and a Supplement to the AFC was submitted on October 26, 2009. The CEC and the BLM entered into a MOU on August 8, 2007

and as lead agencies under CEQA and NEPA agreed that a single environmental report can meet both agencies environmental requirements. It is assumed that any future EIS data and analysis will be incorporated into the CEC's AFC documentation and processes.

D.2 Cooperating Agency

The cooperating agency (CA) role derives from the National Environmental Policy Act (NEPA) of 1969, which calls on federal, state, and local governments to cooperate with the goal of achieving "productive harmony" between humans and their environment. The Council on Environmental Quality's (CEQ) regulations implementing NEPA allow federal agencies (as lead agencies) to invite tribal, state, and local governments, as well as other federal agencies, to serve as CAs in the preparation of environmental impact statements. In 2005, the BLM amended its planning regulations to ensure that it engages its governmental partners consistently and effectively through the CA relationship whenever land use plans are prepared or revised.

State agencies, local governments, tribal governments, and other federal agencies may serve as CAs. CEQ regulations recognize two criteria for CA status: jurisdiction by law and special expertise. The BLM regulations incorporate these criteria.

40 CFR 1508.5 (CEQ) Defining eligibility. "Cooperating agency" means any Federal agency other than a lead agency which has "jurisdiction by law" or "special expertise" with respect to any environmental impact....A State or local agency of similar qualifications or, when the effects are on a reservation, an Indian Tribe, may by agreement with the lead agency become a cooperating agency.

The BLM has invited approximately 4 tribes and multiple state and local agencies to participate in the planning process as Cooperating Agencies. The Department of Energy may be a Cooperating Agency.

II. Scoping Process Summary

A. Notice of Intent

The BLM published a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) on November 23, 2009 in the Federal Register. Publication of the NOI began a 30-day comment period which ended on December 21, 2009. BLM provided a website with Project information that also described the various methods of providing public comment on the Project including an e-mail address where comments could be sent electronically.

B. Public Notification

Notification for a public Scoping Meeting held on January 6, 2010 appeared in the Riverside Press Enterprise on November 24, 2009 and the Ridgecrest Daily Independent on December 26, 2009. Notification was also published on the BLM website on November 23, 2009.

C. Public Scoping Meeting

A public Scoping Meeting was held on January 5th and 6th, 2010 at the Ridgecrest City Hall located at 100 W. California Ave., Ridgecrest, California. A presentation describing the Project was made by Solar Millennium, LLC with presentations describing the environmental review process presented by members of the BLM and CEC. Approximately one-hundred twenty attendees were present during the scoping meetings.

D. Written Comments

Fifty-Eight comment letters were received between both agencies within the original comment period ending on December 21, 2009. The public was permitted fifteen days after the last Public Scoping Meeting on January 6, 2010. The comment period ended January 21, 2010. Another 15 letters were submitted (through January 21, 2010). Most of the comments were received prior to the deadline and are summarized below. It should be noted additional letters were filed with the agency and CEC after this date and most are available on the CEC web site for the Ridgecrest Solar project. Many of those letters raised similar concerns to the letters and comments we have officially examined in this report.

III. Comment Summary and Analysis

Issues were identified by reviewing the comment documents received. Many of the comments identified similar issues; all of the public comment documents were reviewed and the following section provides a summary of the issues, concerns, and/or questions raised. For this report, the issues have been grouped into one of the three following categories:

- Issues or concerns that could be addressed by effects analysis;
- Issues or concerns that could develop an alternative and/or a better description or qualification of the alternatives;
- Issues or concerns outside the scope of the EIS.

The comments discussed below are paraphrased from the original comment letters. To a minor degree, some level of interpretation was needed to identify the specific concern to be addressed. Many of the comments identified similar issues; to avoid duplication and redundancy similar comments were grouped together and then summarized.

Original comment letters may be reviewed up on request at the BLM California Desert District at 22835 Calle San Juan De Los Lagos, Moreno Valley, California, 92553, during normal business hours, from 8:00 a.m. to 4:00 p.m.

A. Effects Analysis

Comments in this category will be described in detail in the affected environment section of the EIS or addressed in the effects analysis for each alternative

Purpose and Need

- Project description should not be narrowly defined to rule out feasible alternatives

Air Resources (Air sheds)

- Greenhouse gas emissions/climate change impacts on plants, wildlife, and habitat adaptation
- Planning for species adaptation due to climate change
- Discussion of how projected impacts could be exacerbated by climate change such as water supply and reliability
- Quantify and disclose anticipated climate change benefits of solar energy
- Discussion of trenching/grading/filling and effects on carbon sequestration of the natural desert

Soils Resources

- Baseline conditions should be described and if the site is disturbed or impaired
- Impacts to desert soils
- Site area is prone to flooding; analysis must address how this may change
- Increased siltation during flooding and dust (see public health as well)
- Disturbance of soils in desert locations can lead to the introduction of invasive weeds
- Preparation of a drainage, erosion, and sediment control plan

Water Resources (Surface and Ground water)

- Effects of additional groundwater pumping in conjunction with other groundwater issues
- Groundwater impacts
- A description of the water rights permitting process and the status of water rights in the basin, including an analysis of whether the water has been over allocated

- An analysis of water reduction alternatives and alternative water sources
- Mitigation options require careful preparation and monitoring
- Water supply impacts related to dust control, fire prevention and containment, vegetation management, sanitation, equipment maintenance, construction, and human consumption

Biological Resources

- If there are threatened or endangered species present, recommend BLM consult with USFWS and prepare a Biological Opinion under Section 7 of the ESA
- Impacts to all known species, not just special status, should be analyzed to assure ecosystem level protection—permanent loss of 4,000 acres of habitat and associated species is significant and cannot be mitigated
- Define and discuss the condition of threatened species in terms of recovery or decline and how use of this site affects these circumstances
- Eliminate all grazing in the area and add fencing to exclude OHV trails and use
- Maximize options to protect habitat and minimize habitat loss and fragmentation
- Impacts associated with constructing fences
- Seasonal surveys should be performed for sensitive plant and animal species
- The proposed site is too important to the Desert Tortoise survival; alternative site is required
- The potential impact to the Mojave ground squirrel at this location cannot be mitigated
- Acquisition of lands for conservation should be part of mitigation strategy
- Mitigation should be 5:1 ratio for habitat removed
- Adaptive management should be considered in program design
- Mitigation should consider the removal of grazing land in habitat designated areas
- Impacts regarding habitat fragmentation and loss of connectivity
- Impact on washes
- Assess if Ravens or other predators will be attracted to mitigation sites.

Vegetation Resources (Vegetative communities, priority and special status species)

- Identify all petitioned and listed threatened and endangered species and critical habitat that might occur within the Project area
- Include a full floral inventory of all species encountered on-site
- Seasonal surveys should be performed for sensitive plant species—lack of fall surveys may under represent onsite plants

- If transplantation is to be a part of the mitigation strategy, a detailed plan must be included as part of the EIS/SA
- Assess Project impacts affecting plant taxa occurring within the Project area that are considered rare within California but more common elsewhere
- Impacts to existing plant communities

Wildlife Resources (Priority species, special status species)

- Desert tortoise; high population density translocation proposed results in high mortality;
- Southern portion of site designated as critical habitat for the MGS (Mojave ground Squirrel).
- Impacts to the following species:
 - Western Burrowing owl
 - Loggerhead shrike
 - Le Conte's thrasher
- Impacts to wildlife movement corridors
- Preserve large landscape-level migration areas

Cultural Resources

- Have archaeological sites been evaluated pursuant to the National Register of Historic Places criteria?
- Site has significant Native American history
- Evaluate impacts affecting Sacred Sites and sacredness.
- Evaluate potential impacts on archeological, cultural, and historical resources in the vicinity of the Project, including, but not limited to: (1) Native American resources, burial sites, and artifacts; and (2) historical mining operations and related artifacts.

Visual Resources

- Visual impacts to wilderness areas; increased light pollution on Desert night sky
- Avoid impacts affecting visually sensitive areas
- Analyze the Project's aesthetic and visual impacts that could affect desert star gazing and Native American practices

Land Use/Special Designations (ACECs, WAs, WSAs, etc.)

- Applicant implies that biological resources within project area are not sensitive because not located within Areas of Critical Concern (ACEC) or Desert Wildlife

Management Area (DWMA), but many areas outside such designated areas do contain significant biological resources

- Use private land not public lands
- Describe reasonably foreseeable future land use and associated impacts resulting from additional power supply

Public Health and Safety

- Evaluate the effects of Valley Fever from disturbed soils.
- Describe the HTF, potential remediation if spilled, remediation plans and offsite disposal

Noise/Vibration

- Consider wildlife as sensitive receptors
- Dry cooling process noise/vibration impacts on wildlife

Recreation (RMAs, facilities, LTVAs, dispersed recreation opportunities, etc.)

- Evaluation should include impacts regarding off-highway vehicle use (OHV), camping, photography, hiking, wildlife viewing, and rock hounding.
- Evaluation should include number of users, value of affected land for recreational purposes, and need to locate and acquire replacement venues for lands lost
- Indirect impacts caused by displacing recreational users
- Cumulative loss of land available for OHV recreation

Social and Economic Setting

- Evaluation of economic impacts due to construction, implementation, and operation.
- Economic impacts regarding loss of commerce due to recreational use losses.

Environmental Justice (minority and low-income communities)

- Evaluation whether diminished recreational access would be placed disproportionately on minorities and low-income communities.

Cumulative Impacts

- Identify impacts from other projects occurring in the vicinity, including solar, wind, geothermal, roads, transit, housing, ORV use, military maneuvers, and other development
- Include reasonably foreseeable Projects; include all the solar and wind applications within vicinity of Ridgecrest

- Identify cumulative impacts of the addition of numerous renewable energy projects on the desert
- Include discussion of cumulative impacts to ground water supply
- Analyze the potential for development and population growth to occur in those areas that receive the generated electricity
- Describe the reasonably foreseeable future land use and associated impacts that will result from the additional power supply; i.e., recreation, grazing, OHV.
- Examine the potential for ecosystem fragmentation associated with the cumulative effects of large-scale industrial development occurring in the California Desert areas
- Analyze the Project's cumulative impacts affecting biological resources
- The cumulative impacts analysis should address species migration needs and other ecological processes that maybe caused by global climate change

B. Alternative Development and/or Alternative Design Criteria

Comments in this category will be considered in the development of alternatives or can be addressed through design criteria in the alternative descriptions.

- Project description should not be narrowly defined to rule out feasible alternatives
- Describe how each alternative was developed, how it addresses each Project objective, and how it would be implemented
- The preferred alternative should consider conjunctive use of disturbed private land in combination with adjacent lower value federal land
- Consider reduced Project size
- Alternatives should include: sites not under BLM jurisdiction such as fallowed alfalfa fields north of the city
- Alternatives should describe rationale used to determine whether impacts of an alternative are significant or not
- Local high winds in the valley will affect design and cooler temperatures at the site will likely require more energy to keep the HTF warm and fluid in the winter months
- Consider reconfiguration alternatives proposed by F&WS to minimize impacts to wildlife movement and sensitive biological resources and washes
- Consider cost and efficiency of energy for different technologies
- Consider alternative technologies that require significantly less water
- Consider the no-action alternative

C. Issues or Concerns Outside the Scope of the EIS

Comments in this category are outside the scope of analysis and will not be addressed in the EIS. Rationale for considering these comments out-of-scope is included.

- Consider development wherein solar and wind is focused first on lands which have lower resource value due to fragmentation, type conversion, edge effects, and other factors
- Consider abandoning the “fast track” approach because it does not allow enough time for an adequate analysis of impacts affecting natural, historical and cultural resource on and around the Project site



BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT
COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION
For the *RIDGECREST SOLAR*
POWER PROJECT

Docket No. 09-AFC-9

PROOF OF SERVICE
(Revised 3/2/2010)

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DECLARATION OF SERVICE

I, April Albright, declare that on, March 26, 2010, I served and filed copies of the attached Staff Assessment and Draft Environmental Impact Statement and Draft California Desert Conservation Area Plan Amendment. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [http://www.energy.ca.gov/sitingcases/solar_millennium_ridgecrest].

The document has been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(Check all that Apply)

For service to all other parties:

- ☒ sent link of electronic document to all email addresses on the Proof of Service list;
☐ by personal delivery;
☒ CD copies delivered on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailed. **Hard copies are available upon request.**

AND

For filing with the Energy Commission:

- ☒ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (preferred method);

OR

- ☐ depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION

Attn: Docket No. 09-AFC-9

1516 Ninth Street, MS-4

Sacramento, CA 95814-5512

docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

Original signed by: _____
April Albright